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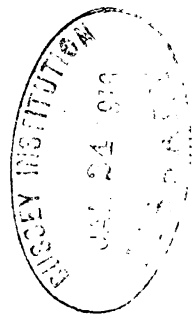
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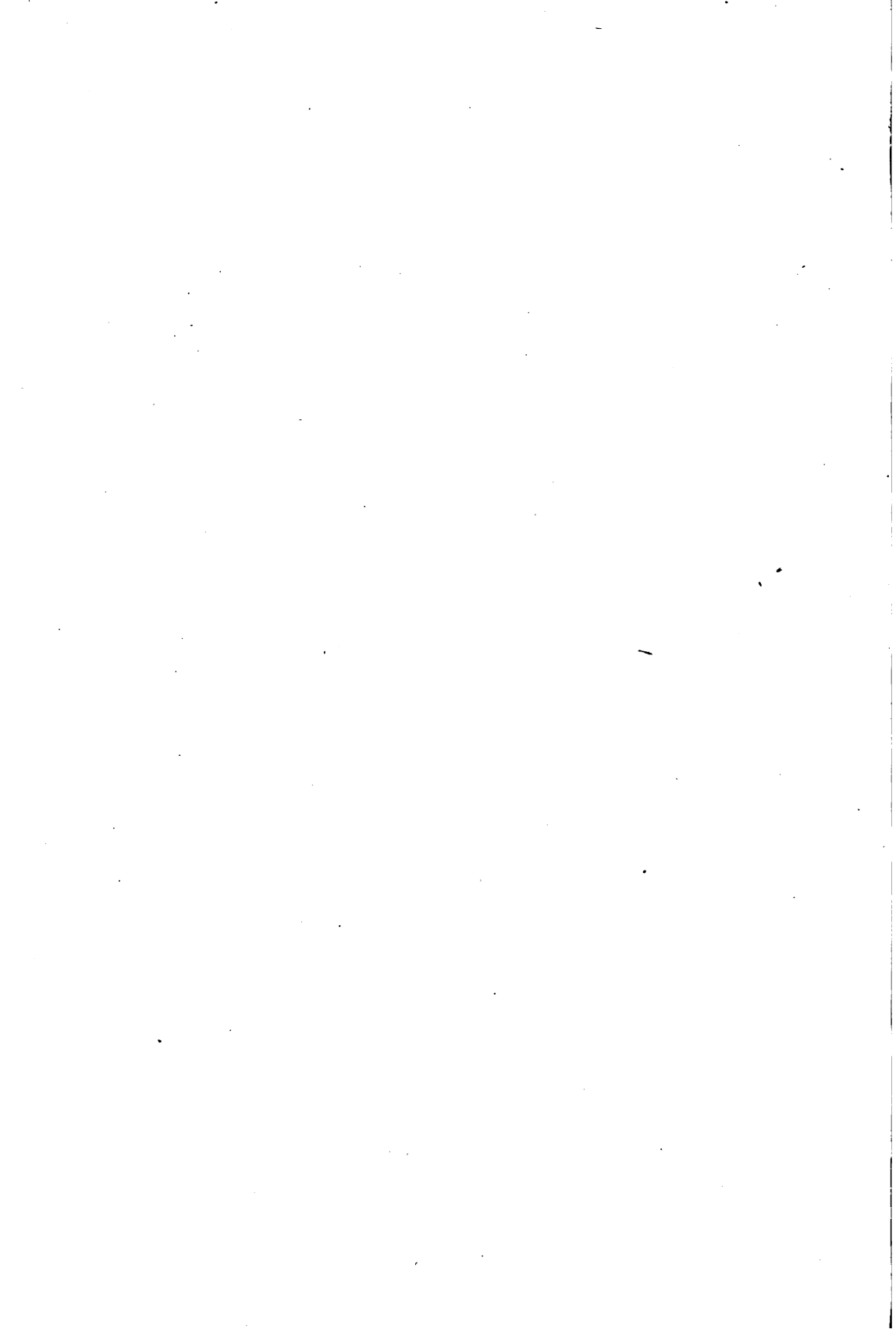
FIRST BIENNIAL REPORT
STATE CROP PEST COMMISSION
WEST VIRGINIA
MARCH 1, 1913 - JUNE 30, 1914

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WEST VIRGINIA STATE CROP PEST COMMISSION.

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S. H. FULTON.....Sleepy Creek
President West Virginia State Horticultural Society.

W. E. RUMSEY.....Morgantown
State Entomologist.



WEST VIRGINIA STATE CROP PEST COMMISSION

Bulletin published quarterly at Morgantown.
W. E. Rumsey, State Entomologist.

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LETTER OF TRANSMITTAL

To His Excellency, GOVERNOR HENRY D. HATFIELD,

SIR: I have the honor to transmit herewith the following report of the West Virginia State Crop Pest Commission prepared by its secretary, the state entomologist. This report covers the inspection work and investigations carried on by the state entomologist and his assistants during the past two years, and is presented for publication in accordance with chapter 14, Acts of the Legislature of 1913.

Respectfully transmitted,

E. DWIGHT SANDERSON,

*Chairman, West Virginia State
Crop Pest Commission.*

Morgantown, W. Va., September 1, 1914.

State Crop Pest Commission

OF

WEST VIRGINIA

FIRST BIENNIAL REPORT

MARCH 1, 1913—JUNE 30, 1914

W. E. RUMSEY

Secretary and State Entomologist

Morgantown, West Virginia
September, 1914

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FIRST BIENNIAL REPORT
OF THE
STATE ENTOMOLOGIST OF WEST VA.

MARCH 1, 1913—JUNE 30, 1914

LETTER OF SUBMITTAL

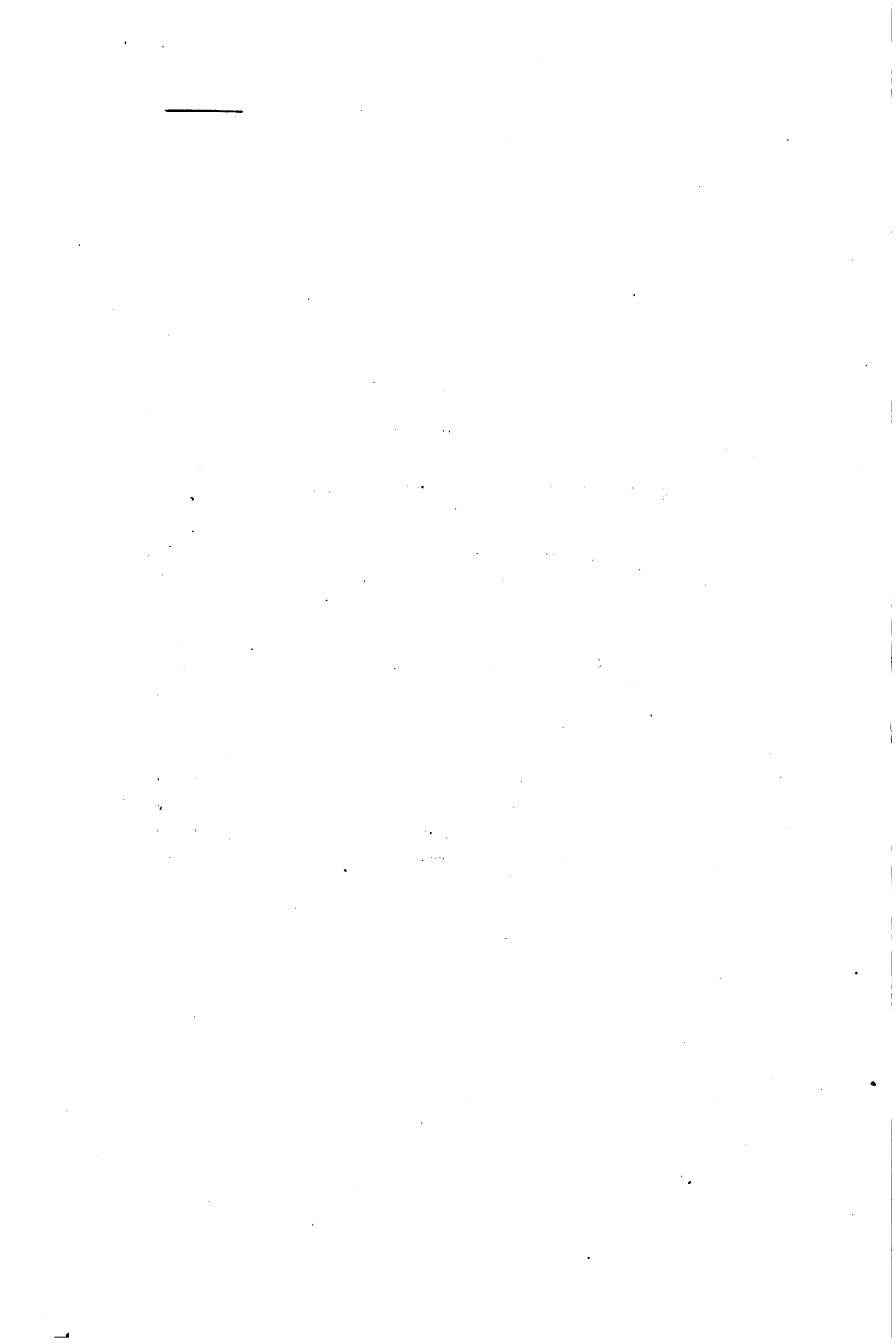
To the WEST VIRGINIA STATE CROP PEST COMMISSION:

I herewith submit my first report as state entomologist under the state crop pest law of West Virginia, known as chapter 14, Acts of the Legislature of 1913. This report includes the forester's report on the eradication of the chestnut bark disease, and covers the period from March 1, 1913, to June 30, 1914.

Respectfully submitted,

W. E. RUMSEY,

State Entomologist.



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REPORT OF THE STATE ENTOMOLOGIST

At the first meeting of the Commission the writer was appointed state entomologist and secretary of the Commission. Steps were immediately taken for the organization of the work under the new Crop Pest Law (Chap. 14, Acts of 1913). Inasmuch as the registration of the nurserymen outside of the state was not required until the first day of July, 1913, it was decided that it would be unwise to attempt the enforcement of section 8 in regard to the delivery of foreign nursery stock by transportation companies before that date. Nursery and orchard inspection also commenced about the same time. The spring months were therefore spent in organizing the work of the Commission, looking up suitable inspectors, preparing proper forms for reports and advising the nurserymen and transportation companies in this and other states of the scope of the new law and its methods of enforcement.

Nursery Inspection.

One of the principal duties of the state entomologist under the new law is to inspect the nurseries of the state and to approve certificates of nurserymen from other states. A full account of the inspection for 1913 is given on pages 20 to 29. Inasmuch as the inspection of nurseries is usually made in September, only the year 1913 is covered by this report. It has been necessary for the state entomologist to keep in touch with and inspect all nursery stock purchased by our local nurserymen for re-sale; to inspect all West Virginia nurseries; to examine stock shipped into our state untagged or improperly tagged; and also to inspect nursery stock imported from foreign countries at the request of the Federal Horticultural Board. Many times it has been impossible to give prompt inspection at points widely distant, even though the delay may have caused considerable inconvenience to the nurserymen affected. It is obviously impossible for one man to be able to handle all of this work promptly without competent assistance. There should be at least one assistant entomologist stationed at the office who can be detailed to this work whenever necessary so that it can be handled as rapidly as possible. We should secure local inspectors in each of the large fruit growing counties, who are competent to examine nursery stock shipped into their territory.

Orchard Inspection.

Thirteen local inspectors were appointed to inspect the orchards in sixteen counties during the summer of 1913. A detailed account of this inspection is given on page 82.

As far as possible men were obtained for inspectors who had had

previous experience in this work. Other men were chosen because of their technical training or because of their practical experience in fruit growing. All of the men appointed were first assembled at West Virginia University and were given instruction in regard to insect pests, plant diseases, and care of orchards, as required by rule 10 of the Commission. Examinations were given the candidates for appointment and inspectors were appointed not only according to their proficiency in written and oral examinations but consideration was also given their experience and general fitness.

The Commission has had considerable difficulty in securing and holding a sufficient number of competent inspectors, as the actual inspection work lasts for only three or four months and during the season when farm labor is most in demand. We are, however, finding a number of well qualified men and in the course of a few years it is believed we will be able to train up a corps of men who can properly carry on the work.

The inspection of the orchards is not only necessary for the prevention of the spread of dangerous pests from orchard to orchard but the inspection of newly planted orchards enables us to keep check upon the inspection of nurseries in this and other states and to determine whether dangerous pests are being sent out from the nurseries, and if they are, from which ones. To be of practical value orchard inspection must not stop at merely locating the troubles that affect the trees but the work must be followed up and the infested trees treated or destroyed. To see that the owners of infested premises properly spray or otherwise treat their trees, the state entomologist must have more men at his disposal who do not find it necessary to cease work on the opening of the University as is the case with the undergraduate student inspectors. As a rule the students whom we engage to act as orchard inspectors do good work, but we must have men who can be in the field during the time when spraying for San Jose scale is possible. This is necessary in order to help the people get started right and do their spraying in a proper manner. Besides this, there must be men to superintend the carrying out of the law where owners of infested orchards neglect or refuse to comply with its provisions. The inspection during 1913 was not properly followed up and there has already been some complaint from orchard owners along this line. This can be remedied as already stated only by retaining a larger force of men during the fall and winter months to keep owners of infested trees stirred up to the necessity of spraying, or by doing it ourselves at their expense in accordance with the law.

The reason that more inspectors have not been retained for the winter months and that an assistant entomologist has not been employed, has been the lack of funds due to our assisting in the control of the chestnut blight as described below. If the appropriation to the Commission could all be expended for nursery and orchard inspection we should be able to employ sufficient assistants to properly carry on the work.

Difficulty has been experienced in one or two counties in securing payment of the salary and expenses of local inspectors as required by

section 10 of the Act. The proposed substitute for the present bill (see Appendix A) gives the state entomologist, by and with the consent of the Commission, power to employ local inspectors and requires the county courts to pay their salaries and expenses without option on their part. This phase of the proposed law is further discussed below.

The orchard inspection in some counties revealed large injuries to apple orchards by cedar rust. One of the objects of the fruit growers in passing the present act was to enable the Commission to control this disease which has caused many thousands of dollars damage. It was decided that it would be best to concentrate our efforts upon this disease during the first season in Berkeley County where it had done most damage and to then extend similar operations to other counties where necessary. A more complete discussion of the work against the cedar rust is given on page 33.

This work should be resumed this fall after the season for peach yellows inspection has passed. We believe there will not be as much opposition against cutting cedars in the future as there has been in the past because of the results obtained in checking the rust where the cedars were destroyed the past year. A proposed substitute for the present law (Appendix A) would give the Commission much more latitude in handling the destruction of cedar trees on the property of persons who are not orchard owners and would enable the Commission to give compensation for trees destroyed where it felt such compensation was equitably due. This is further discussed under the consideration of the proposed law.

Finances.

A detailed statement of the expenditures made by the Commission and certified to by the State Board of Control is given on pages 62 to 68.

Below is given a summary showing the general purposes for which the funds have been expended.

Due to the fact that the general appropriation bill was passed by the Legislature of 1913 before the present Crop Pest Law, the appropriation for this work was made to the Experiment Station as had been previously provided under Chapter 72, Acts of 1907. The appropriation for October 1, 1912 to June 30, 1913, (Sec. 6. Chap. 3, Acts of 1913) was \$4,000. This had already been partially anticipated as was permitted by the general appropriation bill of 1911. The expenditures of the Commission from this \$4,000, therefore, include the funds expended by the Experiment Station for the administration of Chapter 72, Acts of 1907, from October 1, 1912. As a matter of fact it also includes bills incurred from April 29 to October 1, 1912 which had been assigned for payment. This was necessary on account of the fact that all of the funds appropriated for the fiscal year October 1, 1911 to Sept. 30, 1912 were expended by the former director, J. H. Stewart, prior to December 30, 1911, when he resigned as director of the Experiment Station. The Station was therefore without funds with which to carry on this work and it was necessary either to secure payment of the bills by assignment as was done, or to entirely discontinue the work which

would have caused much inconvenience to the nurserymen of the state who would have been unable to ship stock without inspection. This statement seems necessary in order to properly explain the expenditures of the Commission up to June 30, 1913.

Ten thousand dollars per annum is barely sufficient to carry on the work of the Commission as required by the law, provided it is relieved of the chestnut blight control and providing the counties will pay their share of the local inspection.

SUMMARIZED FINANCIAL STATEMENT

WEST VIRGINIA STATE CROP PEST COMMISSION

April 29, 1912—June 30, 1914.

Balance 1912 Appropriation.....	\$	1.26
State Appropriation.....		14,000.00
Crop Pest Fund.....		871.64

	San Jose Scale Fund	Crop Pest Fund
Salaries, Office force.....	\$ 5,262.22	
Salary, Member Crop Pest Commission.....	20.00	
Labor, Orchard Inspectors.....	1,887.95	111.00
Labor, Chestnut Blight Scouts.....	950.31	102.50
Labor, Office Work.....	22.60	
Labor, Miscellaneous.....	12.50	17.23
Traveling expenses, Office Force.....	1,537.18	66.57
Traveling expenses, Orchard Inspectors.....	1,623.37	308.56
Traveling expenses, Chestnut Blight Scouts..	507.30	
Publications	492.51	
Office Supplies	218.50	12.80
Postage and Stationery.....	946.23	4.35
Books	57.70	
Building and Repairs.....	241.18	
Sundry Supplies.....	204.56	
Interest.....	16.20	
	\$14,000.31	\$ 623.01
Balance June 30, 1914.....	.95	248.63

CHESTNUT BLIGHT CONTROL.

The work on the eradication of the chestnut bark disease as outlined by the forester, A. B. Brooks, in his report (appended herewith) indicates that the trouble is getting a strong foothold in the three eastern panhandle counties, namely, Jefferson, Berkeley and Morgan. Besides these, some isolated infections have been found in Hampshire County all of which point to the fact that considerable money and many men are needed if the spread of this disease is to be checked.

Owing to the importance of the chestnut timber in West Virginia it is undoubtedly advisable to continue the work of scouting and cutting out the diseased trees, but this should be done by funds specially appropriated for that purpose. The money for carrying on the work of orchard and nursery inspection and conducting experiments for the purpose of determining the best remedies for lessening the ravages of injurious insects in accordance with the Crop Pest Law is no more than sufficient for these purposes. Therefore, by setting aside a part of the money appropriated for the use of the Crop Pest Commission to eradicate the chestnut blight, orchard inspection has suffered. We believe that either a State Forestry Commission should be established or a State Forester should be employed under the State Department of Agriculture and that legislation should be passed giving ample power and funds for combating this and other forest pests. If this is not done and the chestnut blight work is to be carried on under the State Crop Pest Commission then the Legislature should make ample provision for it by a special separate appropriation.

Now that the forester has gotten chestnut blight eradication work so well in hand it certainly would be a great loss to the state for the legislature to fail to make sufficient appropriation to continue this important work. While we are inclined to doubt whether the spread of the chestnut blight can be entirely prevented by any means now known, we are firmly convinced that it will pay the state to make a hard fight to prevent its rapid spread, so that timber owners may have opportunity to cut and market their chestnut timber to advantage. Otherwise all the chestnut south of the counties now affected will doubtless be killed so rapidly as to make it difficult to handle it to advantage, and this would result in great loss to its owners.

Investigation of Insect Pests.

Besides the inspection of orchards and nurseries the Crop Pest Law provided for carrying on experiments by the state entomologist to devise way and means by which any kind of injurious insect can be controlled. The leaf blister mite has appeared in certain parts of Hampshire and Preston counties where it is doing damage to apple foliage, therefore it would undoubtedly be a good plan to carry on some experiments this winter for its control. Spraying with lime sulphur during the dormant season is claimed to be effective against this comparatively new pest. Besides this experiment the work on borer control should be continued and the most promising materials used against the borers, tried on a commercial scale.

Legislation.

The present Crop Pest Law (Chap. 14 of the Acts of 1913) was drawn by a special committee of the State Horticultural Society in conference with the members of the legislature who introduced it, and after a very careful study of all similar legislation.

As with most laws of this kind, their deficiencies can only be realized by attempting their enforcement. After eighteen months experience with the present law, which is now before the courts as to its constitutionality, the Commission feels that there are several important features which require amendment. Furthermore, Chapter 61 of the Acts of 1905 should be combined with the features of the Act of 1913, so as to prevent the necessity of a duplication of registration by foreign nurserymen.

The Commission submits as appendix A, a bill which it recommends to the legislature for passage to replace all present statutes. In the preparation of this measure the Commission has had the able assistance of its counsel, Hon. Clarence E. Martin, who has been retained to defend the Commission in actions brought against it in Berkeley County. Mr. Martin has thoroughly familiarized himself with the legal weaknesses of the present law and has carefully considered the new law proposed.

This bill gathers into one act all the previous acts passed by the legislature on the subjects it covers and repeals the previous acts. It gives additional authority to the Commission, and more particularly defines it. The statute being an exercise of the police power, it is thought best to define in detail the duties and powers of the Commission and the state entomologist. While the changes suggested are many and the bill practically rearranges the old law, yet none are revolutionary in their character and all are suggested by the experience of the Commission.

The principal change of the present law is the right of appeal to persons whose property is of value, but which may have to be destroyed to prevent the spread of plant diseases. The Commission believes that the bill is clear on the subject and the fault found with the present law will thus be obviated.

Next, the bill proposed gives the Commission additional power relative to the inspection and sale of nursery stock, so essential to the promotion and future development of the fruit industry in this state.

It will be found that the proposed act gives civil jurisdiction to courts to assist the Commission in carrying out its duties, that justices are given concurrent jurisdiction with the circuit court to try misdemeanors thereunder, and that prosecuting attorneys are required to prosecute violations of the act. All these matters are suggested by the experience of the Commission in the past eighteen months.

The present condition of the many branches of horticulture and agriculture of the state and the protection essential and necessary to the crops grown, in order that the wealth of the state may be enhanced, sometimes demand stringent measures, which, while sometimes apparently affecting the rights of property in its narrow sense, are imperative for the general good of the many.

The present proposed bill attempts to soften the rigors of the old law by giving the Commission more discretion, yet at the same time the

amendments proposed to the statutes will allow the Commission to exercise additional power to accomplish the ends for which it was created.

The following summary indicates the proposed changes in Chapter 14, Acts of 1913, section by section:

Section 1 is practically unchanged, except that definitions of the words "plant" and "person" are added.

Section 2 is in lieu of sections 4 and 6 of the present law, and contains a clause whereby the owners may appeal from the order of the state entomologist if his order will destroy property of value to the owner, and provides that the Commission may at its discretion grant indemnity to the owner of such property, half of which cost shall be borne by the county. There seems to be no question in regard to the right of the state to destroy private property under its general police powers, as has been shown by the opinion of the Supreme Court of Kansas in the case of Balch vs. Glenn * which considers from every aspect the questions of law involved in a case against the Kansas Entomological Commission. However, cases not infrequently arise in which it seems equitable to compensate the owner for losses which are due to no fault on his part, and such compensation tends to make the enforcement of the law more effective, as has been found in the enforcement of laws having to do with the condemnation of cattle affected with tuberculosis.

Section 3 replaces section 7 of the present law and provides for a mandatory injunction to compel owners of property to submit to its inspection.

Section 4 replaces section 10 of the present law and defines the duties and authority of the state entomologist, his assistants and local inspectors.

Sections 5 and 6 replace sections 3 and 8 of the present law.

Section 7 is similar to section 12 of the present law.

Sections 8, 9, 10, 11, 12 and 13 embody the requirements set forth in chapter 61 of the Acts of 1905 and also add some new features for the protection of the fruit growers of the state, as proposed by a committee of the American Association of Horticultural Inspectors.

Section 13 is similar to the last sentence of section 12 of the present statute, but gives justices of the peace concurrent jurisdiction.

Section 14 is similar to section 13 of the present statute.

Section 15 is similar to section 14 of the present statute but makes the Commissioner of Agriculture Chairman of the Commission and provides for his approval of expenditures instead of that of the Board of Control.

Section 16 would repeal all present legislation on these matters.

The full text of the proposed bill will be found as appendix A of this report.

* See Journal Economic Entomology Vol. 5, pp 207-216, and Law Reporters.

ORCHARD INSPECTION.

During the summer and fall of 1913 orchard inspection was carried on in thirteen counties, namely, Brooke, Berkeley, Grant, Hampshire, Hardy, Jefferson, Marshall, Mineral, Morgan, Preston, Raleigh, Upshur and Wood. The work was not completed in any of these counties, therefore the inspection will be continued in all this territory wherever it is thought advisable. At the present time, (June, 1914), petitions from eleven other counties are in the hands of the state entomologist asking for an inspector. The petitions came from Cabell, Greenbrier, Mason, McDowell, Mercer, Monongalia, Pocahontas, Putnam, Summers, Taylor and Tucker. Arrangements are now being made to put men into this new territory also.

The San Jose scale, peach yellows and black knot are the chief troubles that are being considered by the orchard inspectors, but apple rust and the chestnut bark disease are receiving considerable attention in certain sections of the state. These subjects are discussed in detail in another part of this report.

An important feature of the orchard inspection work is to have men in the field who not only can identify and suggest remedies or preventives for the insects and plant diseases which are considered dangerously injurious and liable to spread to adjoining property, but also be able to name many of the other common insects and plant diseases which attack the farmers crops, and impart information concerning the handling of orchards. To accomplish this end all prospective orchard inspectors must come to the West Virginia University and take a course in Entomology, Plant and Horticulture.

As a general rule the orchardist and general farmers of the state seem satisfied with the inspection work as carried on under the Crop Pest Law. The idea of following up the inspection by revisiting the owners of infested orchards to see how they are getting along with their fight against destructive insects and plant diseases, and giving them personal advice concerning these troubles, is bearing fruit in that a majority of the people who have but a few fruit trees are spraying and giving them much more attention otherwise. On this account fruit trees of the little home orchards or those growing about the premises of town and city homes will soon be producing as perfect fruit as the trees of experienced fruit growers. In the revisitation the inspectors occasionally find parties who have made no effort to check the insects or plant diseases which are injuring their trees and are liable to spread to those of their neighbors. In such cases the inspector makes it plain to the owner of infected trees that the law requires him to abate the trouble to save his neighbors from financial loss, and that if the work is not done it is the duty of the state entomologist to proceed, after due notice has been given, with the treatment or destruction of the infested trees, the cost of which is to be charged to the owner. Up to the present it has been necessary to resort to this provision of the law but twice.

Number of Trees Inspected During 1913.

The following table gives the number of trees inspected in each of the thirteen counties where inspection was started in 1913, and the number of trees infested.

Orchard Inspection 1913.

Inspector	County	Trees Inspected	San J. Scale	Peach Y's	Black Knot	Total Inspected	Premises Inspected
A. K. Perry	Berkeley	354,468	2,913	91	26	3,030	186
Edw. Behrens	Brooke	20,507	389	539	249	1,177	30
D. E. Swisher	Grant, Hardy	518,939	472	673		1,145	149
L. H. Wolford	Hampshire	750,476	8,094	244	15	8,353	237
D. E. Swisher	Hampshire	136,700	6,786	193		6,979	46
P. C. Manley	Jefferson	113,599	2,051	76	26	2,153	124
T. F. Hansbarger	Morgan	245,950	11,126	88	152	11,366	358
R. H. Gist	Marshall	43,456	364	501	42	907	140
P. W. Dayton	Mineral	370,663	23,768	281	121	24,170	182
E. A. Tuckwiller	Preston	55,783	13	202	713	928	318
E. L. Scott	Raleigh	55,215	5,109	14	1,182	6,305	701
H. L. Crane	Upshur	31,405	4,736	180	191	5,107	199
L. E. Reynolds	Wood	42,389	6,200	106	504	6,810	432
R. W. Muldoon	Wetzel	20,523	353	221	726	1,300	143
Totals		2,760,073	72,374	3,409	3,947	79,730	3,254

Total No. of premises infested with the San Jose Scale..... 1,205.

Total No. of premises infested with Black Knot and Peach Yellows..... 885.

INSPECTION OF NURSERY STOCK.

Inspection of West Virginia Nurseries in 1913.

During the season of 1913, thirty-eight nurseries were inspected. This shows a decrease of two since the 1912 inspection. Undoubtedly there will be other nurseries to drop from the list before the inspection for 1914, from the fact that several nurserymen in Hampshire and Hardy counties started in the business on a small scale three or four years ago when apple seedlings in Kansas were selling at a low figure and there was no registration fee exacted from the nurserymen of the state. The small growers to whom reference has been made are not practical nurserymen but general farmers who perhaps thought by growing a few apple trees they could easily make some money on the side owing to the growing interest in the fruit industry in Hardy and Grant counties. Apparently they did not consider the fact that buyers must be found in order to dispose of their stock for in many cases the inspection of 1913 showed that the farmer-nurserymen had practically the same number of trees on the same plot of ground as when the stock was inspected in 1912. A farmer has too many other things to occupy his time and attention without going on the road to drum up a trade in apple trees. Besides this the registration fee of \$5.00 now exacted from all parties growing trees for sale will tend to lessen these side-issue nurseries.

On the following pages will be found a table giving the names and addresses of West Virginia nurserymen, together with the kinds and amounts of stock grown and also the acreage. From this table it will be seen that many of the nurseries of the state are exceedingly small—mere garden spots.

West Virginia Nurseries. 1913.

Name.	Address.	Kinds of Stock.	Amt. Stock.	Total.	Acreage.
Archer & Co. Wesley.....	Barboursville	{ Apple Pear Plum Apple Apple Pear Peach Plum Cherry	{ 14,000 400 180 5,000 16,000 5,500 250 300 60 100	14,580	1
Bean, E. F.	Romney	{ Apple Apple Apple Apple Pear Peach Plum Cherry	{ 5,000 16,000 5,500 250 300 60 100	5,000	1/2
Bean, Jesse A.	Inkerman	{ Apple Apple Apple Pear Peach Plum Cherry	{ 16,000 5,500 250 300 60 100	16,000	1-1/2
Duckworth, Daniel.....	Greenwood	{ Apple Apple Apple Pear Peach Plum Cherry	{ 10,000 1,900 150 12,000 50 1,400,000 21,000 250,000 500,000 21,000 25,000	6,210	1/3
Everett, J. P.	Romney	{ Apple Apple Apple Pear Apple Apple Pear Apple Pear Peach Plum Cherry Grapes	{ 10,000 1,900 150 12,000 50 1,400,000 21,000 250,000 500,000 21,000 25,000 6,000 12,000	10,000	3/4
Franklin Nurseries.....	Ravenswood	{ Apple Apple Apple Pear Apple Apple Pear Apple Pear Peach Plum Cherry Grapes	{ 1,900 150 12,000 50 1,400,000 21,000 250,000 500,000 21,000 25,000 6,000 12,000	1,950	1
French, C. E.	Fordhill	{ Apple Apple Apple Pear Apple Pear Peach Plum Cherry Grapes	{ 10,000 1,900 150 12,000 50 1,400,000 21,000 250,000 500,000 21,000 25,000	12,050	1
Gold Nursery Co., The.....	Mason City	{ Apple Apple Apple Pear Apple Pear Peach Plum Cherry Grapes	{ 10,000 1,900 150 12,000 50 1,400,000 21,000 250,000 500,000 21,000 25,000	3,217,000	150
Grassy Lick Nursery Co.....	Kirby	{ Apple Apple Apple Pear Peach Plum Cherry Grapes	{ 6,000 12,000 100 200 150 100 100 100	6,000	3/4
Greenwood Nursery Co.....	Greenwood	{ Apple Apple Apple Pear Peach Plum Cherry Shade Apple Pear Peach	{ 6,000 12,000 100 200 150 100 100 100 2,500 50 400	12,650	1
Haines, E. L.	Slanesville	{ Apple Apple Apple Pear Peach	{ 2,950 50 400	2,950	1/8

West Virginia Nurseries. 1913.

Name.	Address.	Kinds of Stock.	Amt. Stock.	Total.	Acreage.
Hardy County Nursery Co.....	Fisher	{ Apple	27,000	28,200	2
		{ Pear	200		
		{ Peach	1,000		
		{ Apple	82,000		
		{ Pear	528		
Hevener & Sons, M. M.....	Roanoke	{ Peach	3,000	86,328	6
		{ Plum	50		
		{ Cherry	50		
		{ Grape	150		
		{ Shade	550		
Highview Nursery.....	Augusta	{ Apple	30,000	33,600	4
		{ Pear	200		
		{ Peach	3,000		
		{ Plum	200		
		{ Cherry	200		
Hilley, G. W.....	Central	{ Apple	5,700	9,760	3
		{ Plum	60		
		{ Raspberries	4,000		
		{ Apple	1,100		
		{ Apple	700		
Hockman, J. W.....	Hoy	{ Apple	3,600	1,100	1 1/16
		{ Apple	3,600		
		{ Apple	8,000		
		{ Apple	3,000		
		{ Apple	85,000		
Hott & Son, Jas. H.....	Slanesville	{ Apple	3,500	80,800	8
		{ Pear	1,300		
		{ Apple	50,000		
		{ Peach	50		
		{ Plum	200		
Liming, D.....	Morgantown	{ Nectarines	75	51,325	8
		{ Ornamentals & Shade	1,000		
		{ Apple	16,000		
		{ Pear	100		
		{ Apple	100		
Loy, S. D. (Adm. E. J. Loy).....	Ruckman	{ Apple	3,000	3,000	1/8
		{ Apple	3,000		
		{ Apple	3,000		
		{ Apple	3,000		
		{ Apple	3,000		
Mallek, J. W.....	Kirby	{ Apple	85,000	80,800	8
		{ Pear	3,500		
		{ Plum	1,300		
		{ Apple	50,000		
		{ Peach	50		
Mathews Bros.....	Slasonville	{ Apple	3,500	51,325	8
		{ Pear	1,300		
		{ Apple	50,000		
		{ Peach	50		
		{ Plum	200		
McMurray & Son, A. T.....	Washington Bottoms	{ Nectarines	75	16,100	3
		{ Ornamentals & Shade	1,000		
		{ Apple	16,000		
		{ Pear	100		
		{ Apple	100		
Milleson, Jos. C.....	Higginsville	{ Apple	3,000	3,000	1/8
		{ Apple	3,000		
		{ Apple	3,000		
		{ Apple	3,000		
		{ Apple	3,000		

West Virginia Nurseries. 1913.

Name.	Address.	Kinds of Stock.	Amt. Stock.	Total.	Acreage.
Moffett, Otto.....	Clarksburg	Raspberries	20,000	20,000	3/4
Mowery, Fred.....	Belmont	{ Raspberries	20,000		
Nalsh, W. H.....	Willow	{ Strawberries	100,000	120,000	2
Orndorff, W. T.....	Headsville	Apple	6,000	6,000	3/4
Pigott, R. H.....	Central	Apple	7,500	7,500	3/4
		Apple	8,000	8,000	1
Point Pleasant Nursery Co.....	Point Pleasant	{ Apple	1,150,000		
		{ Pear	5,000	1,215,000	150
		{ Peach	50,000		
		{ Ornamentals	10,000		
Shanoltzer, C. E.....	Fordhill	Apple	1,000	1,000	1/2
		{ Apple	4,000		
		{ Peach	1,000		
Shanoltzer, Jacob W.....	Romney	Apple	51,000	5,000	1/2
		Pear	6,500		
		Peach	300		
		Plum	1,100		
Shimer, S. S.....	Annamorish	Cherry	2,000	71,900	10
		Quince	500		
		Grape	10,000		
		{ Ornamentals	500		
Shinn, A. K.....	Central	Apple	1,000	1,000	1/6
Shinn, S. A.....	Central	Apple	17,000	17,000	1 1/4
Smith, T. T.....	Hoy	Apple	8,000	8,000	3/4
		Apple	4,550		
Spurgeon, J. C.....	Auburn	{ Pear	300	4,950	1 1/4
		{ Plum	100		
		{ Apple	3,100		
Starnes, M. I.....	Romney	{ Pear	125	3,875	2
		{ Peach	650		
Tucker, A. E.....	Rockoak	Apple	7,000	7,000	1/2

No inspection certificates were issued to the West Virginia nurseries until they had registered with the State Auditor in accordance with the Crop Pest Law. The certificate of inspection has been somewhat changed by the Crop Pest Commission from that in vogue under the old San Jose Scale Law. The form of the certificate now in use is given below:

Nursery		Office of the
Inspection	WEST VIRGINIA	State
Certificate	STATE CROP PEST COMMISSION	Entomologist
	Morgantown, W. Va.	

No. 19....

This is to certify, That the nursery of.....
 at....., in the state of West Virginia, was
 inspected on....., 19...., by.....
 according to Chapter 14 of the Acts of the Legislature of 1913, and the
 nursery stock to be offered for sale by said nursery is apparently free
 from dangerously injurious insects and plant diseases.

This certificate becomes null and void on the first day of October,
 19...., but may be revoked at any time before that date for cause.

.....
 State Entomologist.

Inspection of Nursery Stock From Other States.

Under the Crop Pest Law a West Virginia nurseryman can not sell stock which he may purchase from other states, under his inspection certificate until it has been examined by the state entomologist or his assistant or a local inspector. It is the duty of a nurseryman to notify the state entomologist of the receipt of nursery stock from other states, whereupon the entomologist must proceed at once to examine the shipment. In accordance with this ruling nursery stock from other states for re-sale by our nurserymen has been inspected as shown in the following table:

Nursery Stock Received by West Virginia Nurserymen for Re-sale.*

Consignee.	Consigner.	Date Examined.	Amount Stock	Insects and Diseases.
Gold Nursery Co..... Mason	Farmers Nursery Co..... Troy, O.	Nov. 6, 1913.....	800	Trace of San Jose Scale, woolly aphids and crown gall.
Hevener, M. M. & Sons..... Roanoke	Relly Bros. Nursery..... Danville, N. Y.	Nov. 4, 1913.....	2,297	None.
Hevener, M. M. & Sons..... Roanoke	Panhandle Nurseries..... Greenfield, Ind.	Nov. 4, 1913.....	76	None.
Hevener, M. M. & Sons..... Roanoke	Relly Bros. Nursery..... Danville, N. Y.	Apr. 9, 1914.....	222	None.
Hevener, M. M. & Sons..... Roanoke	Panhandle Nurseries..... Greenfield, Ind.	Apr. 9, 1914.....	630	Some woolly aphids and crown gall.
Highview Nursery..... Augusta	Mt. Arbor Nurseries..... Shenandoah, Ia.	Nov. 11, 1913.....	1,250	None.
Highview Nursery..... Augusta	Mt. Arbor Nurseries..... Shenandoah, Ia.	Apr. 1, 1914.....	1,955	None.
Highview Nursery..... Augusta	Westminster Nursery..... Westminster, Md.	Apr. 14, 1914.....	600	None.
Hilley, J. W..... Central Station	Xenia Star Nursery..... Xenia, O.	Nov. 3, 1913.....	315	None.
Hilley, J. W..... Central Station	Xenia Star Nursery..... Xenia, O.	Apr. 14, 1914.....	696	None.
Mowery, Fred..... Belmont	Southern Nursery Co..... Winchester, Tenn.	Dec. 10, 1913.....	968	None.
Mowery, Fred..... Belmont	Winchester Nursery Co..... Winchester, Tenn.	Apr. 1, 1914.....	716	None.
Pigott, R. H..... Central Station	Xenia Star Nursery..... Xenia, O.	Nov. 3, 1913.....	1,049	None.
Pigott, R. H..... Central Station	Cleveland Nursery Co..... Cleveland, Tenn.	Apr. 14, 1914.....	1,051	None.
Shinn, S. A..... Central Station	Xenia Star Nursery..... Xenia, O.	Nov. 3, 1913.....	1,103	None.
Shinn, S. A..... Central Station	Xenia Star Nursery..... Xenia, O.	Apr. 14, 1914.....	1,051	None.

*The table gives a list of all the W. Va. nurserymen who have reported as having purchased stock from other states for re-sale under their certificate of inspection.

Owing to the changes in the Crop Pest Law from that in vogue under the so-called San Jose Scale Law, several nursery companies of other states failed to meet the requirements before shipping stock into West Virginia during the fall of 1913 and spring of 1914. The transportation companies were likewise slow in carrying out the provisions exacted from them by the new law, consequently the state entomologist was unable to get in touch with all the shipments of nursery stock coming into this state which did not bear the official permit tag. Whenever we were informed by the transportation companies of a consignment of stock for West Virginia points from outside nurserymen, that did not bear the permit tag, we immediately wrote them stating the requirements of the law, and in every case the nurserymen at once took steps to put themselves in the right light concerning the laws of the state if they expected to continue business in the state. This indicates that all nurserymen are willing to conform to our law and that the first offense was due to ignorance of our requirements. Soon after the law took effect an effort was made by this department to enlighten the nurserymen of West Virginia and other states concerning the Crop Pest Law. However, several of the letters were apparently overlooked, judging from the number of shipments that came into our state without bearing the permit tag.

Inspection of European Nursery Stock.

Under the federal law relating to the inspection of imported nursery stock the Federal Horticultural Board of Washington, D. C., notifies the inspectors of the different states whenever a shipment of stock reaches the port of entry consigned to the state in which the inspector has jurisdiction and it is expected that such officer examine the stock at its destination. By this arrangement it is hoped to prevent the introduction and dissemination of foreign insects and plant diseases. Nearly all the imported stock reported as consigned to points in West Virginia between January 1, 1913, and June 30, 1914, has been inspected by the State Entomologist. As a rule the imported stock has been found in good condition and apparently free from dangerously injurious insects and plant diseases. Below is a list of the imports and dates of examination:

Foreign Nursery Stock Shipped Into West Virginia.
From January 1, 1913 to June 30, 1914.

Date		Consignee	Consignor.	Kind of Stock	Amount	Condition.
Import.	Exam.					
1913	1913					
Jan. 21	Feb. 4	Gold Nursery Co., Mason City.....	E. T. Dickenson, Angers, France.....	Cherry, pear and quince....	29,000	3 trees with crown gall.
Feb. 14	Feb. 20	Gold Nursery Co., Mason City.....	Levasseur & Sons, Angers, France.....	Apple and pear.....	100,000	2 trees with hairy root.
Mar. 6	Apr. 22	Am. Horticult. Co., Wheeling.....	Schaum & VanTol, Boskoop, Holland.....	Ornamentals	1,070	Good
Mar. 12	Apr. 22	Am. Horticult. Co., Wheeling.....	Union Nurseries, Ondenbosch, Holland	Ornamentals	7,750	Good
Mar. 28	Apr. 22	Waddington Farms, Wheeling.....	Shipped by request of Simonds & Co., Chicago, from Bos- koop, Holland	Rhododendrons	285	Good
Mar. 31	Apr. 22	Am. Horticult. Co., Wheeling.....	Vincent Lebreton, Angers, France.....	Ornamentals and Evergreens	38,047	Good
Apr. 11	Apr. 25	C. T. Jones, Oak Hill.....	Van Heinengen Bros. Co., Boskoop, Holland.....	Roses	528	Good
Apr. 12	Apr. 22	Am. Horticult. Co., Wheeling.....	Schaum & VanTol, Boskoop, Holland.....	Boxwood	2	Good
Apr. 21	May 13	Am. Horticult. Co., Wheeling.....	Arthur DeMyer, Ghent, Belgium.....	Ornamentals, Shade and Evergreens	26	Good
Apr. 24	May 13	Am. Horticult. Co., Wheeling.....	Koolbergen & Sliedrecht, Boskoop, Holland.....	Shade and Ornamentals.....	431	Good
May 10	May 13	W. E. Weiss, Wheeling.....	Jacs Smits, Naarden, Holland.....	Evergreens	12	Good
May 12	May 23	J. W. Dudley Sons & Co., Parkersburg..	Arthur DeMeyer, Ghent, Belgium.....	Evergreens	144	Good
May 21	May 29	Am. Horticult. Co., Wheeling.....	Koolbergen & Sliedrecht, Boskoop, Holland.....	Evergreens	268	Good
Oct. 4	Nov. 7	John Hellstern.....	Elser & Ankersmit, Melle, Belgium	Azaleas	60	Good

Foreign Nursery Stock Shipped Into West Virginia.—Continued.
From January 1, 1913—June 30, 1914.

Date		Consignee	Consignor.	Kind of Stock	Amount	Condition.
Oct. 13	Dec. 10	G. Obermeyer, Parkersburg.....	Aug. Toeffaert, Destelbergen, Belgium.....	Azaleas	60	Good
Oct. 18	Nov. 7	Frank Siebert, Wheeling.....	O. & T. Deraeve Freres, Mont St. Amand, Belgium.....	Azaleas	99	Good
Oct. 23	Nov. 7	Alt. Lash, Wheeling.....	P. & T. Vandersypt, Lochristy, Belgium.....	Aruncarias and Azaleas.....	191	Good
Oct. 23	Nov. 7	John Dieckman & Co., Elm Grove.....	Decoster Bros., Melle, Belgium.....	Azaleas	331	Good
Oct. 24	Not exam.	Charleston Cut Flower & Plant Co., Charleston.....	VanDillewyn & Thiel, Ghent, Belgium.....	Evergreen shrubs.....	395	
Oct. 24	Not exam	G. W. Alexander, Charleston.....	VanDillewyn & Thiel, Ghent, Belgium.....	Evergreen shrubs.....	101	
Nov. 3	Not exam.	F. A. Harman, Bluefield.....	C. Petrick, Ghent, Belgium.....	Azaleas	35	
Nov. 18	Not accepted	G. A. Smith, Wheeling.....	H. Zyp & Co., Lisse, Holland.....	Azaleas	75	
Nov. 22	Dec. 10	J. W. Dudley & Son, Parkersburg.....	Schaum & VanTol, Boskoop, Holland.....	Ornamentals	2,300	Good
1913	1914					
Dec. 5	Jan. 20	Wheeling Nurseries, Wheeling.....	P. Van Nes, Boskoop, Holland.....	Ornamentals	12	Good
Dec. 17	Jan. 20	Wheeling Nurseries, Wheeling.....	Schaum & VanTol, Boskoop, Holland.....	Boxwood and Holly.....	27	Good
1914						
Jan. 9	Jan. 19	Gold Nursery, Mason City.....	Storrs & Harrison Co., Cleve- land, O., ordered from Angers, France.....	Apple	75,000	6 trees with woolly aphis.....
Jan. 27	Feb. 4	Gold Nursery, Mason City.....	E. T. Dickenson, Chatenay, France.....	Fruit	91,000	8 or 10 with woolly aphis

Feb. 25	Apr. 18	Wheeling Nurseries, Wheeling.....	Union Nurseries, Oudenbosch, Holland.....	Ornamentals and shade.....	533	Good
Feb. 28	Apr. 18	Wheeling Nurseries, Wheeling.....	Schaum & VanTol, Roskoop, Holland.....	Ornamentals and shade.....	645	Good
Mar. 12	Apr. 18	Wheeling Nurseries, Wheeling.....	Holland Nurseries, Aalsmeer, Holland.....	Evergreen shrubs.....	39	Good
Mar. 20	Apr. 18	Wheeling Nurseries, Wheeling.....	Vincent Labreton's Nursery, Angers, France.....	Shade trees and Ornamentals	16,975	Good
Mar. 24	Apr. 18	Wheeling Nurseries, Wheeling.....	Alma Nurseries, Oudenbosch, Holland.....	Shade trees and Ornamentals	62	Good
Mar. 28	Not examined	Geo. E. Steifel Co., Wheeling.....	Schaum & VanTol, Roskoop, Holland.....	Roses	1,000	Sold before inspect- or reached import- er's place.
Apr. 1	Apr. 18	Wheeling Nurseries, Wheeling.....	Alma Nurseries, Oudenbosch, Holland.....	Shrubs and shade trees.....	483	Good
Apr. 3	Not examined	Geo. E. Steifel Co., Wheeling.....	Jacs Smits Co., Naarden, Holland.....	Rhododendrons	500	Sold before inspect- or reached import- er's place.
Apr. 4	Not examined	Stone & Thomas, Wheeling.....	Jacs Smits Co., Naarden, Holland.....	Rhododendrons	104	Sold before inspect- or reached import- er's place.
Apr. 4	Not examined	Geo. M. Snook Co., Wheeling.....	Jacs Smits Co., Naarden, Holland.....	Rhododendrons	48	Sold before inspect- or reached import- er's place.
Apr. 16	Apr. 27	Gold Nursery.....	E. T. Dickenson, Chatenay, France.....	Shade trees and Ornamentals	3,610	Good
May 18	Not examined	Mason City	Arthur DeMeyer, Ghent, Belgium.....	Plants	422	
May 20	Not examined	J. W. Dudley & Sons, Parkerburg	Jacs Smits Co., Naarden, Holland.....	Shrubs	33	
		Wm. C. Wise, Wheeling.....				

Registration of Nurseries.

The new law requires all nurserymen doing business in West Virginia to register with the State Auditor and obtain a certificate. This includes growers of nursery stock both within and without the state, except those from foreign countries. Below is the form of the registration certificate as used during the past two seasons.

Certificate of	WEST VIRGINIA.	Office
Registration	State Crop Pest Commission.	of the
No		State Auditor

Charleston, W. Va., ..., 19..

To whom it may concern:

Be it known that of has paid the state registration fee of Five (\$5.00) Dollars for the privilege of offering for sale, selling, delivering, or otherwise disposing of plants or parts of plants commonly known as nursery stock, as required by Chapter 14 of the Acts of the Legislature of 1913.

All nursery stock grown in West Virginia and sold under this permit must be inspected by the state entomologist, or his assistants, and sold under his certificate. All nursery stock purchased from without the state by a West Virginia nurseryman or dealer for re-sale, must be inspected by the state entomologist, or his assistant, before it can be distributed. Nursery stock from other states or countries for delivery within this state in interstate commerce, shall bear the official permit tag of the West Virginia state entomologist, and also a copy of the inspection certificate of the nursery from whence it came.

This certificate becomes null and void one year from date of issue, but may be revoked within that time for cause.

Countersigned:

.....
State Entomologist.

.....
State Auditor

Official Permit Tag.

The official permit tag furnished by the state entomologist at cost is primarily for the convenience of transportation companies. The presence of this tag on a carload, box, bale or bundle of nursery stock indicates to these companies that the shipper of the stock has registered in West Virginia and that the state entomologist is satisfied with the inspection the stock has had by the inspector of the state from whence it originated, provided, however, a copy of this certificate of inspection is attached to the shipment along with the permit tag.

The law requires that all transportation companies shall notify the state entomologist whenever they receive a shipment of stock, giving the name of the consignor, consignee, destination and whether or not it has attached a copy of the inspection certificate of the state where it originated and the West Virginia permit tag. Below is the form of the permit tag now in use. The color for 1913-1914 is yellow. The same color will not be used two years in succession.

WEST VIRGINIA STATE CROP PEST COMMISSION.

Office of the State Entomologist.

Official Permit No. Morgantown,

THIS IS TO CERTIFY, That permission is hereby given for
the nursery stock grown by

.....
who has been duly registered, to enter and be distributed with-
in the State of West Virginia as provided under authority of
Chapter 14 of the Acts of the Legislature of 1913.

W. E. Rumsey,
State Entomologist.

The date across the center of the card is printed in red and indicates
the time during which the permit is valid.

Up to June 30, 1914, one hundred and thirty-two nurserymen had
registered to do business in West Virginia. In the tables which follow
are given a list of the nurserymen.

Nurseries of West Virginia Registered.

Name.	Address.	Date.	Reg. No.
Archer, Wesley & Co.....	Guyandotte	Aug. 5, 1913.....	37
Bean, E. P.....	Romney	Aug. 21, 1913.....	43
Bean, Jesse A.....	Inkerman	July 24, 1913.....	27
Duckworth, Daniel.....	Greenwood	Oct. 2, 1913.....	61
Everett, J. P.....	Romney	July 29, 1913.....	33
Franklin Nurseries.....	Ravenswood	July 1, 1913.....	8
French, Chas. E.....	Fordhill	July 24, 1913.....	28
Gold Nursery Co.....	Mason	July 17, 1913.....	21
Grassy Lick Nursery Co.....	Kirby	July 28, 1913.....	29
Greenwood Nursery Co.....	Greenwood	Nov. 26, 1913.....	97
Haines, E. L.....	Slanesville	Oct. 29, 1913.....	86
Hardy County Nursery Co.....	Fisher	July 28, 1913.....	30
Hevener, M. M. & Sons.....	Roanoke	July 1, 1913.....	6
Highview Nurseries.....	Augusta	July 28, 1913.....	31
Hiley, G. W.....	Central	July 5, 1913.....	16
Holt, Jas. H. & Son.....	Slanesville	July 1, 1913.....	14
Liming, D.....	Morgantown	Aug. 28, 1913.....	46
Loy, S. D.....	Augusta	Aug. 25, 1913.....	45
Mathews Bros.....	Slissonville	July 1, 1913.....	12
McMurray A. T. & Son.....	Washington	July 21, 1913.....	23
Milleson, Jos. C.....	Higginsville	July 1, 1913.....	10
Moffett, Otto.....	Clarksburg	Sept. 18, 1913.....	57
Mowery, Fred.....	Belmont	Sept. 15, 1913.....	55
Malick, J. W.....	Kirby	Sept. 3, 1913.....	49
Naish, W. H.....	Willow	July 31, 1913.....	35
Pigott, R. H.....	Central Station.....	July 5, 1913.....	17
Pt. Pleasant Nurs. & Orch. Co.....	Pt. Pleasant.....	Oct. 10, 1913.....	68
Orndorff, W. T.....	Headsville	July 17, 1913.....	20
Rose Hill Nursery.....	Annamorlah	July 21, 1913.....	24
Shanholtzer, C. E.....	Fordhill	Aug. 21, 1913.....	42
Shanholtzer, J. W.....	Romney	Oct. 21, 1913.....	85
Shinn, W. K.....	Central Station.....	July 5, 1913.....	13
Shinn, S. A.....	Central Station.....	July 1, 1913.....	11

Smith, T. T.	Hoy	Aug. 21, 1913.	44
Spurgeon, J. C.	Auburn	July 1, 1913.	7
Starnes, M. I.	Romney	Oct. 20, 1913.	78
Tucker, A. E.	Rockoak	Oct. 7, 1913.	66
Wheeling Nurseries.	Wheeling	Apr. 25, 1914.	117

Nurseries of Other States Registered in West Virginia.

Name.	Address.	Date.	Reg. No.
Allen Nursery Co.	Rochester, N. Y.	July 1, 1913.	2
Andorra Nurseries.	Philadelphia, Pa.	Apr. 16, 1914.	113
Athalia Nursery Co.	Athalia, Ohio.	Aug. 11, 1913.	39
Berry, P. D.	Dayton, Ohio.	Oct. 10, 1913.	69
Babbink & Atkins.	Rutherford, N. J.	Apr. 25, 1914.	118
Brow, F. W. Nurs. Co.	Rose Hill, N. Y.	Feb. 28, 1914.	108
Brown Bros.	Rochester, N. Y.	Sept. 8, 1913.	50
Beverly Nursery & Orch. Co.	Beverly, Ohio.	Aug. 1, 1913.	36
Coggeshall, J. C.	Little Hocking, O.	Feb. 26, 1914.	107
Commercial Nursery Co.	Winchester, Tenn.	Feb. 24, 1914.	106
Conard & Jones Co.	West Grove, Pa.	Sept. 12, 1913.	52
Cedar Hill Nursery & Orch. Co.	Winchester, Tenn.	Nov. 4, 1913.	89
Chase Bros.	Rochester, N. Y.	July 1, 1913.	5
Chase Nurseries.	Geneva, N. Y.	July 21, 1913.	25
Cumberland Nurseries.	Winchester, Tenn.	Apr. 17, 1914.	112
Davis, C. C.	Rose Hill, Va.	Oct. 29, 1913.	87
Davis, W. H. & Son.	Smithville, Tenn.	Oct. 16, 1913.	71
Dreer, Henry A.	Philadelphia, Pa.	Sept. 15, 1913.	53
Dunigan, W. H.	Gratton, Va.	Dec. 12, 1913.	101
Eaton, L. D.	Proctorville, O.	Dec. 2, 1913.	100
Elliott Nurseries.	Pittsburg, Pa.	Aug. 14, 1913.	41
Ernst's Chas. Nurseries.	Eaton, Ohio.	Sept. 30, 1913.	60
Fairview Nurseries.	Rochester, N. Y.	July 1, 1913.	1
Farmers Nurseries.	Troy, Ohio.	Oct. 17, 1913.	76
Franklin Davis Nursery Co.	Baltimore, Md.	July 31, 1913.	34
Fruit Growers Nurseries.	Newark, N. Y.	Feb. 7, 1914.	104
Globe Nurseries.	Bristol, Tenn.-Va.	Aug. 13, 1913.	40
Graham Nursery Co.	Rochester, N. Y.	Apr. 16, 1914.	116
Graybill, S. H.	Richfield, Pa.	Apr. 29, 1914.	119
Green's Nursery.	Rochester, N. Y.	Nov. 18, 1913.	93
Hall, L. H. & Co.	Rochester, N. Y.	Sept. 19, 1913.	53
Harris, R. R.	Greenbrier, Tenn.	July 28, 1913.	32
Harrison's Nursery.	Berlin, Md.	Oct. 17, 1913.	75
Hawks Nursery.	Rochester, N. Y.	July 18, 1913.	22
Herrick Seed Co.	Rochester, N. Y.	Oct. 15, 1913.	74
Hood, W. T. & Co.	Richmond, Va.	July 14, 1913.	19
Hooker, Wyman & Co.	Rochester, N. Y.	July 1, 1913.	4
Hoopes Bros. & Thomas Co.	West Chester, Pa.	Oct. 27, 1913.	82
Huntsville Wholesale Nursery Co.	Huntsville, Ala.	Oct. 15, 1913.	73
Kelley Bros.	Danville, N. Y.	Nov. 4, 1913.	88
Kemp, Geo. W.	Princess Anne, Md.	Nov. 18, 1913.	94
Knight & Bostwick.	Newark, N. Y.	Dec. 1, 1913.	99
Lakeshore Nurseries.	Girard, Pa.	Apr. 18, 1914.	114
Laasiter Nursery Co.	Smithville, O.	Oct. 17, 1913.	77
Michell, Henry F. Co.	Philadelphia, Pa.	Apr. 30, 1914.	120
Missouri Nursery Co.	Louisiana, Mo.	Oct. 25, 1913.	81
Moon, Wm. H. Co.	Morrisville, Pa.	Apr. 5, 1914.	110
Mt. View Nursery Co.	Williamsport, Md.	Aug. 29, 1913.	48
Morris Nursery Co.	West Chester, Pa.	Sept. 8, 1913.	51

Nurseries of Other States Registered in West Virginia.—Continued.

Name.	Address.	Date.	Reg. No.
Oak Lawn Nursery.....	Huntsville, Ala.....	Nov. 8, 1913....	92
Page Valley Nursery.....	Kimball, Va.....	July 1, 1913....	9
Pennsylvania Nurs. Co.....	Girard, Pa.....	Aug. 9, 1913....	38
Perry Nursery Co.....	Rochester, N. Y.....	Apr. 18, 1914....	115
Progress Nursery Co.....	Troy, Ohio.....	Oct. 10, 1913....	67
Reilly, Wm. J. Nurseries.....	Danville, N. Y.....	Nov. 8, 1913....	91
Rice Bros. Nursery.....	Geneva, N. Y.....	Sept. 18, 1913....	56
Roesch, Lewis & Son.....	Fredonia, N. Y.....	Oct. 6, 1913....	63
Rush, J. G.....	West Willow, Pa.....	Oct. 20, 1913....	80
Scarff's Nurseries.....	New Carlisle, O.....	Oct. 6, 1913....	62
Schmidt & Botley Co.....	Springfield, O.....	Oct. 15, 1913....	72
Sheerin Bros. Nurseries.....	Danville, N. Y.....	Oct. 29, 1913....	82
Sherwood, Elmer.....	Odessa, N. Y.....	Oct. 16, 1913....	70
Southern Nursery Co.....	Winchester, Tenn.....	July 23, 1913....	26
Spring Hill Nurseries.....	Tippecanoe, O.....	March 18, 1914....	109
Standard Nursery Co.....	Rochester, N. Y.....	July 1, 1913....	13
Starbuck, Addison.....	Colerain, O.....	Nov. 4, 1913....	90
Stark Bros. Nurs. & Orch. Co.....	Louisiana, Mo.....	July 14, 1913....	18
Stewart, C. W. & Co.....	Newark, N. Y.....	Oct. 6, 1913....	64
Storrs & Harrison Co.....	Painesville, O.....	Oct. 20, 1913....	79
Taylor, H. S. & Co.....	Rochester, N. Y.....	Dec. 19, 1913....	103
Van Lindley, J. Nur. Co.....	Pomona, N. C.....	Sept. 29, 1913....	59
Virginia Nurseries.....	Richmond, Va.....	July 1, 1913....	3
Vincennes Nurseries.....	Vincennes, Ind.....	Oct. 29, 1913....	83
Virginia Wholesale Nurseries.....	Blacksburg, Va.....	Nov. 28, 1913....	98
Watson, F. W. & Co.....	Topeka, Kan.....	Nov. 19, 1913....	95
Western N. Y. Nursery.....	Rochester, N. Y.....	Aug. 28, 1913....	47
Westminster Nurs. Co.....	Westminster, Md.....	Sept. 15, 1913....	54
Wharton Springs Nurs. Co.....	Smithville, Tenn.....	Nov. 25, 1913....	96
Willowdale Nurseries.....	Kennett Square, Pa.....	Apr. 14, 1914....	111
Woodlawn Nurseries.....	Rochester, N. Y.....	Feb. 14, 1914....	105
Xenia Star Nurseries.....	Xenia, O.....	Dec. 13, 1913....	102
Young Bros. Nursery.....	Smithville, Tenn.....	Oct. 6, 1913....	65

CEDAR RUST ERADICATION IN BERKELEY COUNTY.

The apple-rust or so-called "cedar rust" is making its presence exceedingly obnoxious to the fruit growers in certain sections of the state for it has caused the loss of thousands of dollars worth of apples within the last three or four years. Besides destroying the apple crops it has injured the trees to a great extent—so devitalizing them one year that they are unable to develop fruit buds for the next year's crop.

This rust disease has two host plants, namely, apple trees and red cedar trees, both of which must be present before the disease can perpetuate itself and spread. The life history of this fungus disease and the relation between red cedar trees and rust in apple orchards is discussed by N. J. Giddings in Bulletin No. 2 of the Crop Pest Commission which is included in this report (page 85.)

Why Apple Rust Is Prevalent in Certain Sections.

As already stated, this disease requires the presence of both the apple and red cedar trees. Therefore in territory where red cedars are abundant and apple orchards of susceptible varieties are numerous

the fungus which causes the trouble will flourish. Wherever conditions are suitable and abundant food is to be had insects or plant diseases always multiply or increase to such an extent as to become exceedingly injurious or even destructive to the plants upon which they feed.

In the red cedar belt we often hear the remark, "red cedar trees have always been here and my grandfather was never bothered with rust on his apple trees." Such parties do not stop to consider the fact that in those early days comparatively few apples were grown and that those grown were of a variety which had undoubtedly become immune, or nearly so, by long association with the trouble. Just enough of the disease developed on some of the apple trees to carry the trouble along year by year until the development of the apple industry in this section, and the introduction of varieties susceptible to the disease has furnished an abundance of food for the stage of the fungus which lives on the apple. ^{Now} The red cedar trees having been ever present the disease has ~~not~~ reached a point where it is doing great damage to the orchard industry in such localities.

Value of the Red Cedar Tree.

In the eastern panhandle where the red cedar grows in abundance there seems to be a great difference of opinion among the farmers and fruit growers as to the real value of this tree. One man may hold that it makes excellent fence posts while another emphatically states that it is of no value for this purpose and says he would not set them for posts under any consideration. A large per cent of the cedars growing in the fruit belt of Berkeley and Jefferson counties, or in other fruit sections of the state, are not large enough to make suitable posts and since locust trees, which do make most excellent fence posts, as a rule also grow in all this territory, it seems as if an artificial or fictitious value has been placed upon the red cedar trees.

If cedar trees are not cut they will soon take a pasture field, for no grass will grow under them nor will cattle or any other kind of farm stock feed on these trees—not even angora goats. The picture on page 35 (Fig. 1) illustrates nicely how the red cedar trees spring up in the pasture fields of the eastern panhandle. This photograph was made near Inwood, Berkeley county, West Virginia. A weed is defined as a plant out of place or growing where it is not wanted. At least in such cases as shown in this picture, the red cedar becomes like a noxious weed. However, we must not lose sight of the fact that these trees have their aesthetic value in that they add to the landscape and beautify many a rugged rock break of the eastern panhandle, and also when planted along highways add much to the beauty of the scenery. (Fig. 3.)

How the Apple Rust or So-called Cedar Rust Can Be Prevented.

Carefully conducted experiments carried on by N. J. Giddings, Plant Pathologist of the Experiment Station, has proved that apple rust can be checked by spraying, but there are only two or three days in which



Fig. 1. Cedars "Taking" a Pasture Field. Berkeley County.



Fig. 2. Cleaning up Big Cedars near Orchards, Berkeley County.

this can be accomplished after an infection takes place, and there may be three or four periods during the spring and early summer when this infection is brought about. Therefore one can readily see the impracticability of spraying to control this trouble in commercial orchard sections.

Since it has been fully established that the red cedar tree and the apple tree are the host plants of the fungus which causes the apple rust, it is obvious if one or the other of these trees be removed the development of the disease will cease. We all appreciate the apple tree and know its value, hence to save this valuable fruit the red cedar must be destroyed in the apple growing sections of the state. Already the cry has been raised in Berkeley County, "Down with the cedars growing near apple orchards."

The cedar tree harboring as it does a dangerously injurious plant disease, comes within the scope of the Crop Pest Law, and since spraying cannot check the trouble, the destruction of all such trees within one mile of apple orchards has been decided upon by the Crop Pest Commission as the only feasible remedy for the trouble.

Why the Work of Fighting the Rust Disease Was Concentrated in Berkeley County.

On account of the importance of the apple industry in Berkeley County and the call of the fruit growers for assistance to check the damage caused by apple rust in their orchards owing to the alarming extent to which this disease had increased in the last three or four years in this territory, the Commission concentrated its energies in this county not only to assist the orchardists of this section but also to demonstrate to the people of the state at large that the most feasible method of checking the so-called "cedar rust" lies in the destruction of red cedar trees in the vicinity of apple orchards.

With this object in view, the state entomologist was sent into Berkeley County in April, 1913, to look over the situation concerning the trouble and devise ways and means whereby the cedar trees could be destroyed with as little friction as possible between the orchardists and general farmers. Before this time a majority of the apple growers in the county had cut out the cedars on their property and also done considerable work along this line on adjoining lands where the owners did not object to the loss of the cedars. After spending about two weeks in the county the state entomologist found that owing to other duties requiring his attention it was necessary for him to leave the territory for a time. Thereupon a local inspector was appointed by the Crop Pest Commission to carry on the work of educating the people concerning the rust disease and the danger of allowing red cedar trees to grow near apple orchards, also to bring about cooperation between the fruit grower and the general farmer. As a rule the latter were opposed to the Crop Pest Law which made it possible for the Crop Pest Commission to order the destruction of red cedar trees which harbor a stage of the fungus disease that is liable to spread and do serious damage to apple orchards in the vicinity. On the other hand,



Fig. 3. Big Cedars Along Highways in Berkeley County.

the fruit growers were over anxious to have the Crop Pest Law enforced to the letter, hence instead of the inspector being able to bring about the necessary cooperation the breach between the general farmer and fruit grower became wider and wider until in February, 1914, when the inspector began destroying diseased red cedar trees growing on the property of an extensive land owner, the clash came. The owner had the inspector arrested for trespass and got out an injunction to restrain the Crop Pest Commission or any of its employees from entering upon his property. For a time this action seemed to be a stumbling block preventing the destruction of cedars in order that the prospective apple crop for 1914 in Berkeley county might be saved.

Policy of the Commission Concerning the Cutting of Cedars.

On account of the opposition encountered in cutting cedar trees to prevent damage to apple crops the Commission adopted the following policy: In sections of the county where the apple industry had developed sufficiently to warrant the condemning of cedar trees as a nuisance, on account of such trees harboring one stage of a disease seriously injurious to apple crops, such cedars must be destroyed or the halls removed therefrom. Where there is but an isolated apple orchard here and there in a section where cedars are exceedingly abundant then no action is to be taken toward destroying the cedar trees. The Commission decided to furnish men to assist and superintend the cutting of cedars free of cost to owners of such trees, provided orchardists would do the bulk of the work. After settling on this mode of procedure the state entomologist was sent out to get the cedar owners to consent to their trees being cut provided it would cost them nothing, and, pointing out to the fruit men that if nothing was done until the litigation in the matter was adjusted it would be too late to save their coming crop, hence they must furnish men at once to clean up cedars in their respective neighborhoods. The orchardists saw the necessity of prompt action and willingly furnished men. On account of the Commission putting in men to superintend the work it convinced the cedar owners that the cutting and cleaning up would be properly done and their consent, as a rule, was readily obtained. Under this arrangement thousands upon thousands of red cedar trees were cut (Fig. 2) before the first of May and the dissemination of rust spores prevented. The fruit growers and general farmers now realize that the one cannot get along without the other in their rich agricultural community.

Results Obtained by Cutting Red Cedar Trees Near Apple Orchards.

As already stated, thousands upon thousands of red cedar trees growing near apple orchards in Berkeley County were cut during the winter and spring of 1914 with the expectation that apple rust would be checked in these orchards and the crop saved. That we might be able to convince the general farmers and other disbelievers as to the cause of rust in apple orchards, a trip was made over much of the

apple section of the county after the disease had developed and the results of the observations are here noted. Although on account of an unusually dry May the rust was not so prevalent in any locality as it otherwise would have been, the result of cutting the cedars showed a striking diminution of the amount of rust injury over previous years. An orchard that showed considerable rust, especially along its southern border, has cedar trees growing to the southwest of it at a distance of 2,300-3,600 feet. According to N. J. Giddings' records an infection from cedar apples took place on May 5, 1914, and the wind at that time was blowing from the south and southwest with a velocity of about 20 miles per hour. Practically no rust spots showed on the foliage which had developed after the date of the infection mentioned. Another infection took place in the county June 4, 1914, but at this time the wind was from the northeast, hence there is no injury from rust from this infection in the orchard under consideration because there are no cedars within a mile or more to the northeast of the orchard. Several other orchards besides the one mentioned were visited and only one or two of them showed a slight amount of rust. In all cases the rust was more abundant in that part of the orchard nearest to cedar trees. The results in one orchard examined were especially gratifying. Two years ago this orchard was surrounded by cedars and the apple crop of that year was a complete failure from rust, as far as York Imperials were concerned. Besides the loss of the crop the vitality of the trees was so impaired that they did not produce fruit buds for a 1913 crop. During the winter and spring of 1912-1913 the owner cut all the cedars near his orchard and in the spring of 1914 the Commission and orchard owners cut more cedars in the vicinity, thus the cedars that were near enough to cause serious loss from apple rust are now practically all destroyed. This orchard has a crop this year and showed but a slight infection of rust, the latter being found in the northeastern corner. This part of the orchard is low and across the fields to the northeast we saw one large cedar tree located on an eminence about three quarters of a mile away. The wind was in just the right direction to carry the spores from this tree to the orchard on the June 4th infection.

From the observations made during the trip just described evidence points to the fact that cedar trees must be removed more than one-half mile from apple orchards to reduce rust injury sufficiently to prevent it from damaging apple crops. Besides the distance of the cedars and the direction of the wind during an infection period, many other things must be considered, such as the elevation of the cedars in relation to the orchard, height of the cedars, and the number of cedar balls they bear.

PERIODICAL CICADA OR SO-CALLED SEVENTEEN YEAR LOCUST.

The arrival of Brood V of the periodical cicada as discussed in Bulletin No. 4 of the Crop Pest Commission came apparently a little ahead of the date the brood appeared in 1897. At least this was the case in some localities. The difference in time is accounted for by the weather conditions. This year (1914) we had a warm dry May, while the same month seventeen years ago was wet and cold.

On June 23, 1897, A. D. Hopkins and the writer drove from Morgantown, Monongalia county, to Cranesville, Preston county, for the purpose of making observations on the abundance of the cicada and its limit of range. At that time the swarm was at its best, the songs of the males made a perfect "din" during the day until we arrived at the crest of a ridge overlooking Cranesville, where we left the sound behind us—as well as the cicadas themselves—for we came to the limit of their range in this quarter when two-thirds of the way up the ridge. On June 24, 1914, the writer drove over the same territory accompanied by P. B. Wiltberger. At this time we found the cicada on the decline. Thousands of them had already died and the highway was strewn with their bodies. The people along the way informed us that "the locusts were much more numerous about a week ago." This indicates the effect the weather has on the appearance of the cicada for the territory was traversed at practically the same time in June during the occurrence of the two different swarms. The limit of range of the 1914 swarm was found to be practically identical with that of 1897 in so far as the boundary line near Cranesville is concerned.

Distribution of the 1914 Swarm of the Cicada in West Virginia.

To determine the distribution of the cicada in West Virginia for 1914 return post cards were sent out asking for information concerning the occurrence and abundance of the insect. Many replies were received and from this data the accompanying map (Fig. 4) has been prepared which corresponds in the main with the distribution of this brood as shown by the map published by A. D. Hopkins in Bulletin No. 68 of the West Virginia Agricultural Experiment Station and reproduced in Bulletin No. 4 of the Crop Pest Commission. From observation and information obtained through correspondence and otherwise, it appears that the cicada does not extend its area of distribution much beyond its original habitat.

Abundance of the 1914 Swarm.

The correspondence concerning the abundance of the cicada (Figs. 6 and 7), and the personal observations made along this line seem to indicate that on the whole there was not much difference between the numbers of this insect in the 1897 and the 1914 swarms. The photograph (Fig. 5) on page 43, of the cast skins on a small bush under some neglected apple trees will give some idea of the abundance of the cicada near Morgantown.

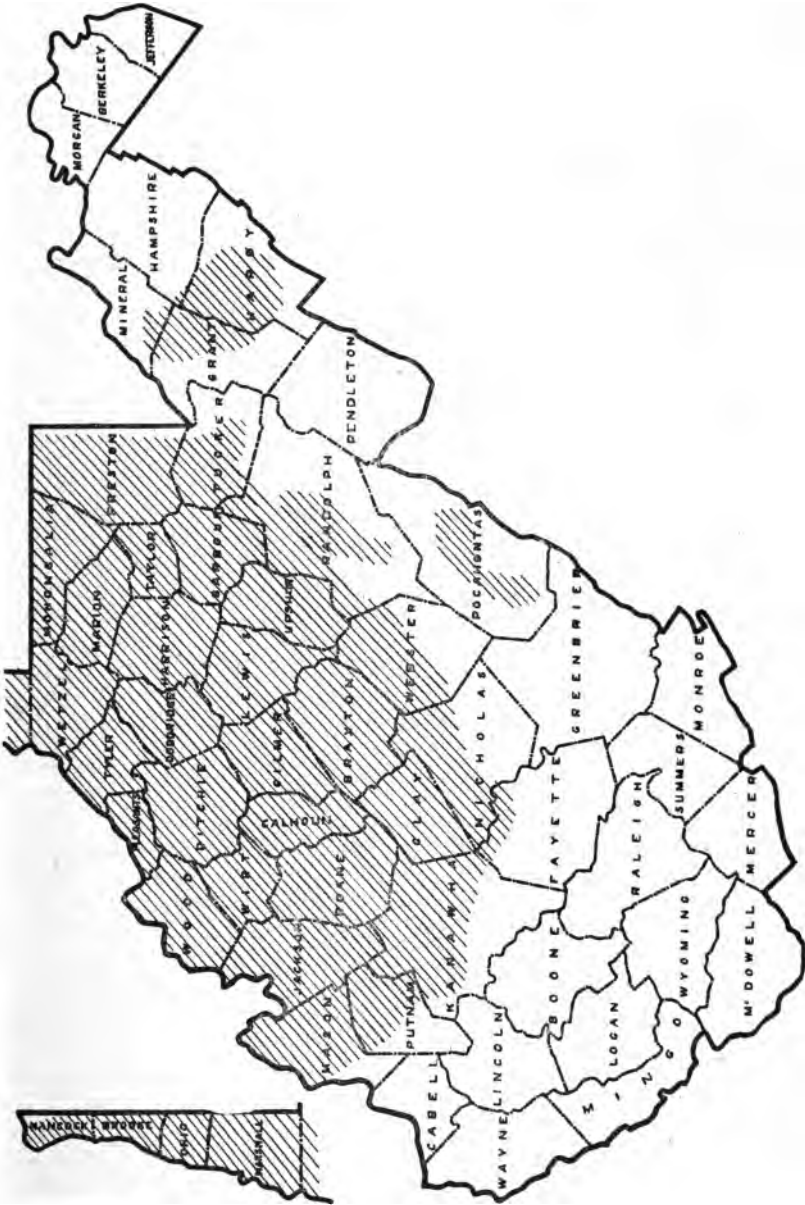


Fig. 4. Shaded area of map showing distribution of Brood V of the Periodical Cicada as it occurred in West Va. in 1914

Injury by the Cicada to Young Fruit Orchards.

The cicada did much damage to young fruit orchards, especially where the trees had been planted on new ground (Fig. 9). This is due to the fact that the cicada is always more abundant in wooded territory, and so where the timber has been cleared away to make room for an orchard, when the brood appears it finds but an occasional tree where previously there was a forest and consequently oviposition is concentrated on the comparatively few trees, and serious injury to the young orchard trees is the result. It is always advisable not to prune young orchards the winter previous to the appearance of a cicada swarm or to plant orchards one or two years before a brood is due.

How a Young Orchard Was Saved.

A young orchard of over 5,600 one and two-year-old apple and peach trees (Fig. 10), owned by Arthur Gold, in Mason county, which had been planted on new ground, was saved from ruin by covering the trees during the stinging period of the cicada. Not being aware of the occurrence of a brood of cicada in 1914 the owner of the orchard pruned the trees to his liking in February and March. When he was informed that this year (1914) was "Locust year" in Mason county he determined to put forth heroic efforts to save his orchard from their destructive work. Accordingly he procured 2,712 yards of "tobacco cotton" (a thin cloth used to cover tobacco seed beds) and with the first indication of cicada stinging a force of men were hired and the trees covered as shown in the illustration on page 51 (Fig. 10). The cloth was wound about the trees and pinned with 6-penny wire nails. A single tree in its "winding sheet" is shown on page 48 (Fig. 8). To show what might have been the condition of this orchard a few trees were left uncovered. The picture on page 49 (Fig. 9) gives some idea of the condition of these unprotected trees. They were killed back to the ground. The illustration on page 52 (Fig. 11) is that of a protected tree some weeks after the coverings had been removed.

Below is an itemized statement of the cost of protecting 5,600 one and two-year-old fruit trees from cicada injury:

2,712 yards tobacco cotton, @ 3½c.....	\$ 94.92
40 lbs. nails, @ 4c.....	1.60
16 days labor placing cloth, @ \$1.25.....	20.00
6½ days labor removing cloth, @ \$1.25.....	8.12
	\$124.64

CONTROL OF THE APPLE AND PEACH TREE BORERS.

This experiment has been under way since 1912 and consists of wire cages placed about the base of the trees, asphaltum applied to the trunks a few inches below the soil and from a foot to eighteen inches above, and the application of spray materials to the base of peach trees in the fall to determine if possible a substance which will penetrate the outer bark and destroy the young peach tree borers



Fig. 5. "Abandoned Homes"—Cicada Skins as they Appeared on an Apple Sprout under an Old Apple Tree.



Fig 6. Cicada Assembling on Apple Tree.



Fig. 7. Cicada Resting on a Peach Tree before Beginning to Oviposit.
This Tree was later Protected as Shown in Fig. 8.

without injuring the trees. The substances used for this purpose are as follows: "Lysol" 25%; Formalin 50%; Miscible oil 1-9; Emulsion of Avenarius Carbolineum and Soap; Crude Oil and "Kreso" 12½%. Of these substances "Lysol," Miscible oil, Carbolineum Emulsion and "Kreso" seem to indicate that they will check the borers without injuring the trees. The other substances do not indicate that they are of any value, although none of them seem to injure the trees except the crude oil which killed every tree to which it was applied.

Wire Cages on Apple and Peach Trees.

The bronze wire cages on apple trees (Fig. 13) seem to be of practical value, although at the top of these cages in a number of instances the adult apple tree borer deposits its eggs, and the young borers begin work under the bark. However, these are readily detected and easily removed, being far above the surface of the ground. The cages on peach trees do not seem to be of any use. This may be due to the fact that the cages were applied to the trees on a side hill and heavy rains washed the soil from the base of the cages, thus giving the moths an opportunity to reach the base of the trees to deposit their eggs before the soil was replaced. Or, a more likely reason, the young borers may crawl between the meshes of the wire, since it is a well known fact that the peach tree borer does not lay her eggs wholly on the bark of the trees but about the ground on the grass, weeds or twigs, or something of the sort.

Facts Concerning the Use of Asphaltum.

Thus far the use of asphaltum against the peach tree borers in the East does not seem to be of any practical value. The rapid growth of the peach soon breaks open the asphaltum, especially at the lenticels, thus giving the newly hatched borers numerous openings to the bark of the tree. This material used against the apple tree borer (Fig. 14) seems to be more promising from the fact that the apple tree grows less rapidly and therefore ruptures in the asphaltum seldom occur during a growing season. However, the lenticels are induced to make corky tissue rapidly, which causes the asphaltum to protrude from the surface of the bark like blisters (Fig. 15). There does not seem to be any injury either to the peach or apple trees where asphaltum has been applied. Of course, to obtain satisfactory results with this material against the apple tree borer it is necessary to make a fresh coating of the substance over the trunk each spring.

Some Results From Treating the Base of Peach Trees.

Three substances applied to the base of peach trees, namely, asphaltum, miscible oil and carbolineum emulsion, were compared with check trees which showed the following results: Nineteen trees treated with asphaltum gave an average of 8 17-19 borers per tree. The same number sprayed at the base with miscible oil averaged 1 2-19 borers per tree, and where carbolineum was used on a like number of

trees the average proved to be 11-19 of a borer to a tree. The nineteen check trees gave an average of 4 5-19 borers per tree. This seems to indicate that there is some virtue in the miscible oil and carbolineum emulsion. If when tested on a commercial scale these substances reduce the number of borers per tree as indicated above it will undoubtedly be a great help to commercial peach growers in fighting this destructive pest.

It is the intention of the state entomologist to try out the promising materials this fall on something like a commercial scale, in the Sleepy Creek Orchard to determine whether or not this method of checking peach tree borers is practical.



Fig. 8. In a "Winding Sheet"—Young Fruit Tree Protected from Cicada Stings.



Fig. 9. Cicada Injury to Peach Tree. The Stinging Killed the Tree Back to the Ground.

REPORT OF CHESTNUT BLIGHT ERADICATION.

A. B. Brooks.

Control Work Begun.

Following an investigation of the distribution of Chestnut Blight in West Virginia, conducted through agents of the U. S. Department of Agriculture during the fiscal year 1912-13, the state began active control work. The West Virginia State Crop Pest Commission, at its meeting in Charleston June 3, 1913, adopted a resolution, effective July 1, 1913, appointing a forester "in charge of chestnut blight eradication." The Commission at this meeting also voted to set aside \$2,500.00 for use in controlling chestnut blight during the coming fiscal year, and to cooperate with the State Commissioner of Agriculture, who agreed—in addition to paying the salary and field expenses of the forester—to furnish from his own funds an amount sufficient for the employment of a number of men to collect statistics relative, chiefly, to the abundance and distribution of chestnut blight in West Virginia. At a subsequent meeting of the Commission, held in Martinsburg October 21, 1913, it was ordered that the forester "be authorized to employ scouts and cutters in chestnut blight eradication up to July 1, 1914, whose salaries and expenses shall not exceed \$300.00 per month." Approximately \$2,000 was spent by the Commission in this work. The funds thus made available through the Crop Pest Commission were sufficient for the employment of four men; and these, together with the two agents of the U. S. Department of Agriculture, and the five men employed by the State Commissioner of Agriculture, constituted a working force of eleven men.

Observation of Work in Pennsylvania.

Before continuing control measures and employing the whole number of men provided for, however, it was thought advisable to study carefully methods that were being employed for eradication of blight in some state which had been successful in this work. Accordingly, the forester, together with the agent of the U. S. Department of Agriculture employed at that time, visited—in company with Mr. S. B. Detwiler, General Superintendent of the Pennsylvania Chestnut Blight Commission—several sections in Pennsylvania where chestnut blight infections had been destroyed, and noted the methods followed there. As a further aid in getting work started along approved lines, Mr. J. W. Sitler, who was an employee of the Pennsylvania Blight Commission, and thoroughly acquainted with every detail of control work in that state, was employed on August 25 to work in the infected sections of Berkeley County along with three local men employed on the same date.

Plan of the Work.

Since a number of infections had already been located along the mountain ridges of the three easternmost counties of the state, it was decided to destroy these first and so remove the most apparent dangerous sources of infection; but not to destroy the infections on

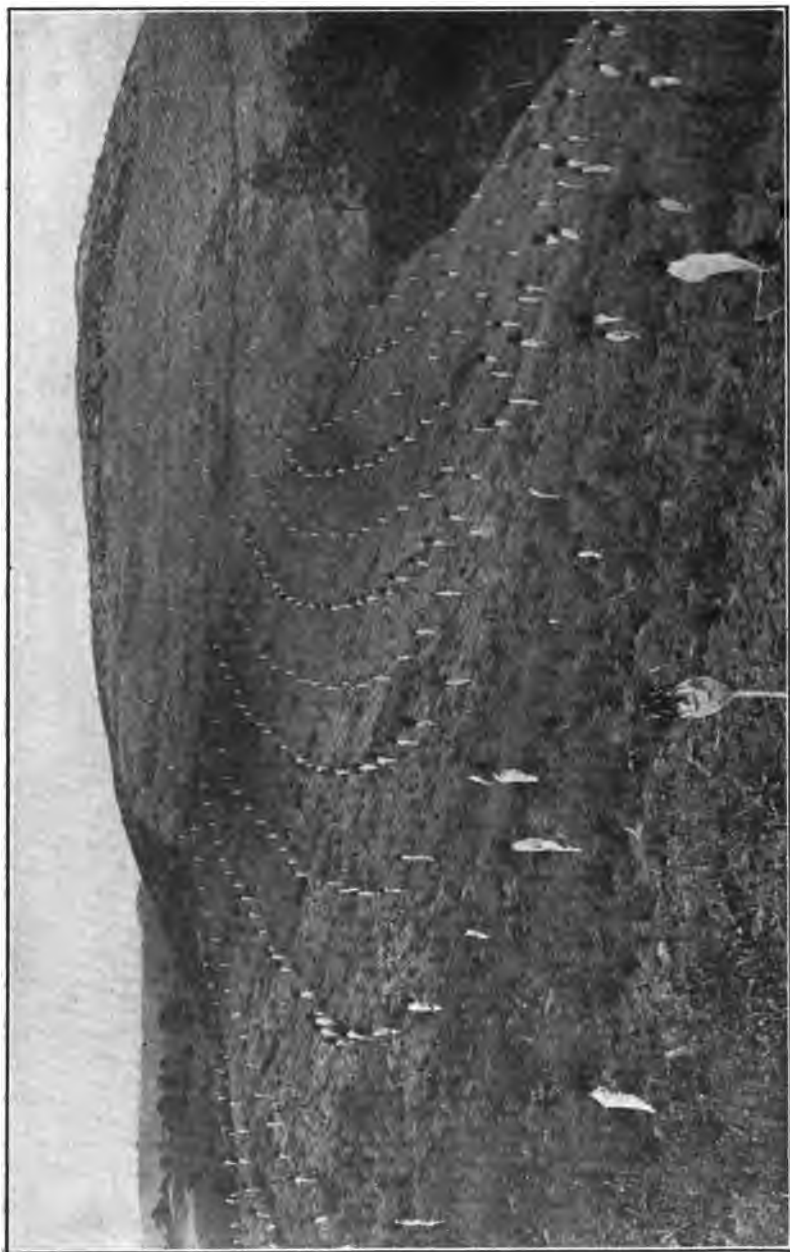


Fig. 10. One and Two-Year-Old Apple and Peach Orchard Protected from Cicada Stings—Brood of 1914.



Fig. 11. Peach Tree Several Weeks After the Tobacco Cotton Had Been Removed.



Fig. 12. Cicada Injury in Apple Twigs Showing how the Woolly Aphis Attacks the Wounded Places. Enlarged.



Fig. 13. Fencing out Round Headed Apple Tree Borers by Use of Wire Netting. Note Cotton in Top of Cage.



Fig. 14. Painting Base of Apple Trees with Asphaltum to Prevent Egg Deposit by Adult of Round Headed Apple Tree Borer.

the west face of Blue Ridge Mountain, in Jefferson County, owing to the fact, first, that these latter infections lie closely adjacent to those on the Virginia side, and second, that the Shenandoah valley separates the chestnut timber on the Blue Ridge from that on the next ridge to the west by a distance of about 25 miles. This wide valley contains but few chestnut trees and apparently forms an effectual barrier to the westward spread of the blight from the Blue Ridge. It was further planned to re-visit the places where infections had been destroyed at the earliest date after the first cutting in order to determine the completeness of the former work and to destroy the blight which was in its incipient stage and was at first unobserved. In addition to removing blighted trees that had been overlooked it was decided to cover the whole area more carefully during the second visit and to search also in all parts, not previously visited, of the three counties.

Selection of Scouts and Cutters.

During the fall additional scouts and cutters were employed but it was not until January that the full crew was made up. Considerable care was exercised in selecting men, and not a little difficulty was experienced in finding those whose familiarity with the woods, interest in the work, aptness to learn and observe, moral character, etc., were such as to fit them for the undertaking.

Control Work in Berkeley County.

During the fall months the principal blight infections were destroyed in turn on Little North Mountain, Back Creek Valley, Third Hill, and the west face of Sleepy Creek Mountain, in Berkeley County. In addition to destroying blighted trees considerable hurried scouting was done between the blighted areas, previously found, and a number of small infections were thus located and destroyed. The total number of infections treated and destroyed in Berkeley County, up to June 30 (according to the methods outlined in Bulletin 2, embodied in this report) was 161; and the total number of trees destroyed was 1,486. The smallest infections contained but one tree; the largest infection, situated in Back Creek Valley, contained 308 trees.

Many of the trees found were already entirely dead, having been infected five or six years. In such cases there were usually present large numbers of fruiting organs of the kind that produce wind-distributed spores (ascospores); and frequently all the blight in a spot infection could be easily traceable to a single dead or dying tree standing in some prominent place near the center of the diseased area. In some instances where twig infections were found in large trees, the diseased twigs were cut out and the trees left standing. While a hasty search was made in all parts of Berkeley County where chestnut timber grows plentifully, yet up to the last of June it had been impossible to revisit areas first covered. It is doubtless true that more painstaking and careful work would result in locating a number of addi-



Fig. 15. Portion of Apple Tree Trunk Showing Results of Applying Asphaltum. Lenticels make Corky Tissue and push out the Asphaltum in Grotesque Protuberances.

tional infections. The oldest and most dangerous ones, however, were nearly all destroyed.

Control Work in Morgan County.

Late in the fall work was transferred to Morgan County, though the location of county lines is such that certain sections of Morgan and Berkeley counties were alternately visited in the first winter months. For a time in early winter the scouts and cutters occupied an abandoned camp of coal developers on Short Mountain, Morgan County, and afterward, during part of a period of snowy weather, they moved south, working along the Berkeley county face of Sleepy Creek Mountain and destroying the small scattered infections as they were found. The largest infections found in this region were located on Short Mountain. When all the infections that could be reached from the temporary camp on Short Mountain and from farm houses along the mountain base were destroyed, the men were transferred to the region near Great Cacapon Station and between that station and Berkeley Springs.

The number of infections destroyed in Morgan County up to June 30, was 101, and the number of trees destroyed was 5,936.

State Camp Built.

In order to make possible the most effective work in Great Cacapon Mountain, Morgan County, where the largest infections are located,



Fig 16. Work of the Chestnut Blight. View Showing Mature Chestnut Killed in Forest Area.

the state was influenced to allow the purchase of a small tract of land and to furnish funds to buy materials for a substantial camp to be erected thereon and to be used as headquarters for the men during the long period necessarily required in destroying the blight in that region. Two acres favorably located about seven miles south of Great Cacapon Station were purchased at a cost of \$12.00 an acre and during the period of heavy snows a camp was built and equipped to accommodate a dozen or more men. Infections including several thousand trees are located on the west face of Great Cacapon Mountain near



Fig. 17. Work of the Chestnut Blight. View showing Destruction Of Young Chestnut Stand in Forest Area.

the camp, and an infection of nearly two thousand trees which was destroyed on Tonoloway Mountain, as well as numerous smaller infections, are in reach from the camp. Work from this point began on April 1, and was still in progress June 30.

Scouting in Preston County and Along Pennsylvania and Maryland Lines.

During the year several of the wooded sections of Preston County were visited and carefully examined for blight. This county, which is well timbered with chestnut, is exposed to the blight fungus by an infection in Pennsylvania and, on that account, it has been the aim to keep a careful watch there. So far, however, none of the disease has been found. At several other points also in the counties that border Pennsylvania and Maryland, a hurried search has been made for blight.

Reports of Blight from Interior Counties.

Several reports of the dying of chestnut trees in Randolph, Barbour, Upshur, Marion, Monongalia, and other counties have been followed up with the result, in every case, that dying was found to be due to other causes than the blight. Laurel Hill, which contains much chestnut timber, was followed through portions of Barbour, Randolph, Tucker, and Preston counties. Specimens of fungi collected on Laurel Hill, as well as others collected in Monongalia County and at other points west of the Alleghany Mountains, have been determined as harmless species that closely resemble the blight fungus.

Effects of Forest Fire Injuries.

Throughout the whole region where chestnut blight is distributed forest fires are of frequent occurrence, and in most cases run unhindered until stopped by heavy rains or by natural barriers, such as cleared fields, rivers and roads. A fire which burned northward along Great Cacapon Mountain, Morgan County, in the fall of 1912, covered an area of more than forty square miles; and many others burned over smaller areas in the same year. Within the territory burned at that time there were scattered spot infections of chestnut blight ranging in size from one tree to perhaps twenty trees. Ordinarily, the disease would have spread out from these spots at a moderate rate; but the fire scars on the trunks of the chestnut trees afford a suitable place for the entrance of the blight fungus, and thousands of trees are now diseased that would still be free from blight had they not been injured by fire. This result is especially noticeable on the west face of Great Cacapon Mountain where basal fire scars are so frequently followed by basal blight infections.

Preventing and Controlling Forest Fires.

Having noted the effects of forest fires in aggravating the spread of chestnut blight—as well as the more apparent and serious results—all hands have been instructed to use great caution while burning blighted bark and other infected parts of trees in the woods. Fires are set only at the most favorable times and these are carefully watched until all danger is past. Before setting fire to heaps of bark and limbs a space about them is raked bare of leaves and other inflammable materials. Smokers who belong to the crew are not allowed to smoke while scouting through the woods. As a result of this caution not a single fire has escaped from the thousands of those set during the year.

It has been the aim not only to prevent forest fires but to endeavor to extinguish nearby fires that others have allowed to escape or have intentionally started. A fire that threatened to sweep the entire length of Third Hill and Short Mountains, in Berkeley and Morgan counties, was extinguished—without any assistance from the outside—in the fall of 1913.

Revisiting Destroyed Infections.

Time has not yet allowed the revisiting of many of the destroyed infections. A few of them, however, located in Back Creek Valley, Berkeley County, have been examined recently by Prof. R. Kent Beattie, of Washington, and Mr. Flippo Gravatt, of Virginia, accompanied by the writer. Conditions, in these cases, were found to be very satisfactory—the evidence of the disease showing in but a few places.

A Short-cut Experiment Begun.

By consent of forest pathologists of the U. S. Department of Agriculture, who have examined conditions on the ground, an experimental cutting of diseased chestnut has been begun near the state chestnut blight camp, on Cacapon Mountain. The aim of this experiment is to determine to what extent the spread of blight can be checked by felling the diseased trees and leaving them flat on the ground—untreated and unburned. The grounds for hope of fair success in this apparently unscientific experiment lie in the fact that the type of spore that is wind-distributed is much less likely to be carried long distances when near the ground and when decaying blighted tree trunks become overgrown by weeds and other vegetation. Observations have shown that in cases where old blight cankers have been found on large trees near the ground and on small trees, the spread from them is very slight as compared with the spread from old cankers located high up on large trees that stand in prominent locations. It can be stated, on behalf of this experiment, that it is being begun in an infection which is too large to be handled more carefully with the funds now available; and also that the felling of trees is necessarily the first step in more careful control work which can be completed at some future time should the necessary funds be provided.

Aid from Owners in Cutting.

No cutting of chestnut trees has been done on land until after the owners were notified and their consent obtained. In most places where blight has been found the chestnut timber has been culled so closely and has been so frequently visited by fires that owners consider it of little value, and consequently have been slow in responding to a request to assist in eradication work. Not a few owners, however, have aided freely and have promised to endeavor to keep their lands clear of blight in the future.

Literature Distributed.

Upon request of Mr. J. C. Nellis, of the U. S. Forest Service, a list of about one thousand names of timberland owners in Berkeley, Jefferson and Morgan counties was made up and a copy forwarded to him. On receipt of the names each was sent a copy of a bulletin entitled, "Uses for Chestnut Timber Killed by the Bark Disease."

Bulletin No. 2, of the West Virginia State Crop Pest Commission has been widely distributed throughout the region where blight is found.

Keeping Record of Infections.

A careful record has been kept of all infections found. This has been done by marking locations on field maps and entering data on infection sheets prepared for this purpose. The infection blank which is filled out for each infection contains the serial number of the infection, a number referring to its location on topographic maps, its location by state, county, and magisterial district, name of land owner, and twenty other items descriptive of the infection, etc. On the reverse side of each sheet a simple diagram is drawn in such a way as to make it possible for any infection to be found without difficulty.

Present Distribution of the Blight.

The general distribution of blight in West Virginia has not been found, so far, to be greatly different from that reported near the beginning of the past fiscal year (Fig. 5.), namely, in the three easternmost counties of the state. A small infection has been located, however, as far west as Paw Paw, Morgan County, and, in place of the one infection reported in Hampshire County, a year ago, more than a dozen can now be reported. Outside of these western and southern extremes no blight has been found. What appears to be an authentic report, however, comes recently from northwestern Pendleton County—a section not yet visited. The small number of infections reported previously has been multiplied many times during the past year's scouting within the infected area and infections reported as containing five hundred trees are now known to contain several times that number.

STATEMENT OF DISBURSEMENTS ON ACCOUNT OF SAN JOSE SCALE AND CROP PEST FUNDS.

April 29, 1912—June 30, 1914.

Balance 1912 appropriation	\$	1.26
Mar. 1, 1913-June 30, 1913 State Appropriation.....		4,000.00
July 1, 1913-June 30, 1914 State Appropriation.....		10,000.00
Mar. 1, 1913-June 30, 1914 Crop Pest Fund Receipts.....		871.84

San Jose Scale.

1912		
April 29	W. E. Rumsey.....	\$ 24.53
29	W. E. Rumsey.....	183.33
May 27	W. E. Rumsey.....	141.34
June 27	W. E. Rumsey.....	202.76
July 15	W. E. Rumsey.....	31.55
31	W. E. Rumsey.....	125.00
Aug. 24	W. E. Rumsey.....	125.00
Sept. 21	W. E. Rumsey.....	66.54
27	W. E. Rumsey.....	125.00
Oct. 10	W. E. Rumsey.....	36.32
	Farmers & Merchants Bank.....	16.20
24	W. E. Rumsey.....	32.66
28	W. E. Rumsey.....	125.00
Nov. 25	W. E. Rumsey.....	149.40
Dec. 24	W. E. Rumsey.....	150.56
26	E. D. Sanderson.....	13.93
1913		
Jan. 27	W. E. Rumsey.....	125.00
Mar. 1	W. E. Rumsey.....	27.70
	W. E. Rumsey.....	183.33
10	H. L. Smith.....	41.52
11	E. D. Sanderson.....	29.81
31	H. L. Smith.....	50.55
	E. D. Sanderson.....	11.89
Apr. 1	Anna Toynbee.....	12.50
	W. E. Rumsey.....	43.22
	W. E. Rumsey.....	183.33
	Ethel McClure.....	2.25
	Kentucky Tobacco Products Co.....	10.50
	Acme Press.....	188.60
	W. E. Rumsey.....	183.33
May 1	Anna Toynbee.....	50.00
	Remington Typewriter Co.....	104.25
	Thomsen Chemical Co.....	1.40
7	W. E. Rumsey.....	77.63
	F. L. Bowman.....	164.85
31	B. L. Marble Chair Co.....	14.32
	Gunn Furniture Co.....	24.48
	Dance & Burgess.....	24.15
	W. E. Rumsey.....	183.33
	Anna Toynbee.....	50.00
	Acme Press.....	18.50
	S. Spencer Moore.....	3.63
	Irving Pitt Mfg. Co.....	30.36
	Baker-Vawter Co.....	18.37
	Mathers Printing Co.....	26.50
June 10	E. D. Sanderson.....	32.93
	W. E. Rumsey.....	44.81

		G. & W. E. Price.....	51.30
30		Anna Toynbee.....	50.00
		W. E. Rumsey.....	183.37
		W. E. Rumsey.....	78.95
		F. L. Bowman.....	13.67
		Kentucky Tobacco Products Co.....	10.50
		Rothwell Co.....	15.23
		Horticultural Chemical Co.....	1.96
		R. W. Johnson.....	1.10
Aug. 1		W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00
		Acme Press.....	127.75
		G. & W. E. Price.....	4.40
		C. D. & P. Tel. Co.....	4.95
		Acme Press.....	23.00
		John Wiley & Sons.....	36.00
		A. J. Dadisman.....	.70
		R. W. Johnson.....	2.05
		D. N. Day.....	5.00
		G. D. Chase.....	7.50
8		E. D. Sanderson.....	13.52
30		W. E. Rumsey.....	61.55
		Anna Toynbee.....	50.00
		W. E. Rumsey.....	183.33
		Voigtlander & Sohn.....	53.29
		Bausch & Lomb.....	27.45
		McMillen Company.....	19.20
Aug. 31		Irving Pitt Mfg. Co.....	24.00
		T. F. Hansbarger.....	26.35
		D. E. Swisher.....	17.40
		P. C. Manley.....	6.00
		L. H. Wolford.....	22.45
		A. K. Perry.....	10.30
		H. H. Green.....	7.70
		E. L. Scott.....	21.50
		H. L. Crane.....	10.40
		R. H. Gist.....	13.65
		L. E. Reynolds.....	12.45
		Edw. Behrens.....	9.85
		E. A. Tuckwiller.....	15.13
Sept. 10		Mathers Printing Co.....	1.55
		J. M. Riffe.....	4.45
		Acme Press.....	2.40
		F. L. Bowman.....	10.00
		United Gas Implement Co.....	5.84
		H. S. Cushwa.....	4.80
Oct. 1		H. L. Crane.....	39.00
		R. H. Gist.....	25.02
		P. W. Dayton.....	8.77
		R. W. Muldoon.....	15.50
		J. W. Sittler.....	60.00
		W. E. Rumsey.....	145.45
		Anna Toynbee.....	50.00
		W. E. Rumsey.....	183.33
		Thomas Bros.....	12.00
		Mathers Printing Co.....	15.30
		Acme Press.....	15.00
		F. L. Bowman.....	30.00
7		A. K. Perry.....	36.00
		D. E. Swisher.....	48.00
		T. F. Hansbarger.....	78.00
10		A. K. Perry.....	24.63

		T. F. Hansbarger.....	81.10
		J. W. Sitler.....	39.24
		Reliance Engraving Co.....	4.68
Nov.	1	A. K. Perry.....	38.40
		T. F. Hansbarger.....	59.70
		A. K. Perry.....	66.00
		T. F. Hansbarger.....	54.00
		L. H. Wolford.....	36.00
		E. D. Sanderson.....	19.70
		H. S. Cushwa.....	18.85
		W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00
		Mathers Printing Co.....	23.70
	10	L. H. Wolford.....	18.00
		L. H. Wolford.....	11.75
		Acme Press.....	108.10
	24	T. F. Hansbarger.....	57.75
		L. H. Wolford.....	18.90
		F. L. Bowman.....	40.00
Dec.	1	W. E. Rumsey.....	183.33
		H. L. Smith.....	12.55
		W. E. Rumsey.....	102.70
		Anna Toynbee.....	50.00
		Mathers Printing Co.....	18.95
		Mrs. E. S. Marchand.....	4.10
		D. E. Swisher.....	23.00
		L. H. Wolford.....	22.70
		D. E. Swisher.....	27.00
		L. H. Wolford.....	30.00
	10	Central Ohio Paper Co.....	29.89
		T. F. Hansbarger.....	36.00
		W. A. Colerider.....	7.00
1914			
Jan.	1	W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00
		Ethan Allen.....	1.00
		Carrie Toynbee.....	4.40
		F. L. Bowman.....	30.00
		H. H. Woodford.....	40.13
		H. H. Woodford.....	16.00
		G. L. Albright.....	13.43
		H. H. Woodford.....	105.77
		G. L. Albright.....	36.31
		Snowden Webber.....	21.52
		L. H. Wolford.....	15.00
		T. F. Hansbarger.....	150.00
		L. H. Wolford.....	10.95
		T. F. Hansbarger.....	86.43
		T. F. Hansbarger.....	45.95
	6	A. B. Brooks.....	8.34
Feb.	1	T. F. Hansbarger.....	75.00
		L. H. Wolford.....	30.00
		H. L. Crane.....	27.00
		P. C. Manley.....	9.00
		R. W. Muldoon.....	10.50
		R. H. Gist.....	15.00
		H. L. Woodford.....	48.51
		B. O. Woodford.....	36.33
		G. L. Albright.....	32.34
		Snowden Webber.....	18.48
		W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00

		Mathers Printing Co.....	4.25
		Acme Press	7.00
		Reliance Engraving Co.....	3.50
		W. E. Rumsey.....	85.47
	7	W. E. Rumsey.....	14.83
		E. D. Sanderson.....	33.63
		H. L. Crane.....	4.95
		L. H. Wolford.....	8.25
		P. C. Manley.....	24.00
		F. L. Bowman.....	105.00
Feb.	7	C. D. & P. Tel. Co.....	14.20
		R. H. Gist.....	23.79
		Snowden Webber.....	10.15
	24	Geo. L. Albright.....	23.50
		Snowden Webber.....	16.75
		H. H. Woodford.....	27.25
		B. O. Woodford.....	27.95
		D. E. Swisher.....	10.10
		L. H. Wolford.....	39.02
Mar.	2	H. H. Woodford.....	60.00
		B. O. Woodford.....	45.00
		G. L. Albright.....	40.00
		Snowden Webber.....	40.00
		L. H. Wolford.....	42.00
		D. E. Swisher.....	12.00
		T. F. Hansbarger.....	75.00
		P. W. Dayton.....	45.00
		Acme Press	42.25
		Mathers Printing Co.....	11.00
		John Wiley & Sons.....	2.50
		W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00
		E. D. Sanderson.....	23.29
		W. E. Rumsey.....	33.98
		Washington Electrotpe Co.....	1.40
		Reliance Engraving Co.....	6.53
		Morgantown Hardware Co.....	8.40
		E. A. Swink.....	24.00
		H. S. Cushwa.....	26.01
		C. D. Burns.....	13.70
		Z. W. Zitler.....	7.80
		Berkeley Installment Co.....	6.00
		W. O. Nichols.....	55.00
		A. B. Brooks.....	42.09
		P. W. Dayton.....	23.45
	14	L. M. Munson.....	21.50
April	1	B. O. Woodford.....	45.00
		G. L. Albright.....	40.00
		H. H. Woodford.....	32.34
		Snowden Webber.....	21.58
		W. E. Rumsey.....	66.19
		C. C. Keedy.....	6.85
		L. H. Wolford.....	102.00
		D. R. Dodd.....	48.00
		E. L. Scott.....	63.00
		L. E. Reynolds.....	32.50
		T. F. Hansbarger.....	75.00
		E. L. Scott.....	23.48
		Carrie Toynbee.....	3.50
		H. S. Cushwa.....	8.83
		W. E. Rumsey.....	183.33
		Anna Toynbee.....	50.00

April 2	Central Ohio Paper Co.....	18.01
	Acme Press	1.00
	Mathers Printing Co.....	2.50
9	B. O. Woodford.....	25.90
	Snowden Webber.....	23.20
	H. H. Woodford.....	14.84
	Snowden Webber.....	15.55
	Geo. L. Albright.....	25.05
	H. H. Woodford.....	25.74
	Geo. L. Albright.....	21.75
	B. O. Woodford.....	30.07
	B. O. Woodford.....	20.30
	G. L. Albright.....	20.70
	H. H. Woodford.....	19.05
	L. H. Wolford.....	17.00
	L. H. Wolford.....	12.65
	T. F. Hansbarger.....	63.10
	L. H. Wolford.....	21.35
	S. L. Dodd, Jr.....	16.33
	T. F. Hansbarger.....	78.59
	D. R. Dodd.....	15.70
	P. W. Dayton.....	21.65
	S. L. Dodd, Jr.....	18.95
	T. F. Hansbarger.....	2.65
	F. O. Dobyns.....	57.75
10	Acme Press	179.70
18	F. L. Bowman.....	10.00
May 1	L. H. Wolford.....	22.35
	F. E. Timbrook.....	28.50
	S. L. Dodd, Jr.....	40.48
	T. R. Alkire.....	20.83
	D. E. Swisher.....	23.75
	D. E. Swisher.....	9.70
	R. H. Gist.....	34.04
	R. W. Muldoon.....	5.55
	T. F. Hansbarger.....	7.25
	T. F. Hansbarger.....	57.34
	D. E. Swisher.....	63.00
	F. E. Timbrook.....	24.00
	T. F. Hansbarger.....	75.00
	R. W. Muldoon.....	6.00
	L. E. Reynolds.....	7.50
	R. H. Gist.....	18.00
	L. H. Wolford.....	30.00
	Carrie Toynbee.....	3.50
	S. L. Dodd, Jr.....	64.00
	P. W. Dayton.....	111.00
	T. F. Hansbarger.....	7.45
	T. R. Alkire.....	27.00
	H. H. Woodford.....	34.65
	B. O. Woodford.....	45.00
	G. L. Albright.....	40.00
	N. J. Giddings.....	18.17
May 1	W. E. Rumsey.....	161.29
	W. E. Rumsey.....	183.33
	Anna Toynbee.....	50.00
	Mathers Printing Co.....	5.00
	Mathers Printing Co.....	2.00
June 1	P. C. Manley.....	1.00
	T. F. Hansbarger.....	75.00
	P. W. Dayton.....	18.00
	P. C. Manley.....	7.50

	S. L. Dodd, Jr.	44.00	
	P. W. Dayton	69.38	
	L. E. Reynolds	9.20	
	S. L. Dodd, Jr.	29.89	
	T. F. Hansbarger	46.20	
	P. W. Dayton	14.00	
	S. H. Fulton	20.00	
	W. E. Rumsey	21.07	
	S. H. Fulton	9.91	
	G. L. Albright	40.00	
	B. O. Woodford	45.00	
	C. S. Rowe	40.00	
	W. E. Rumsey	183.33	
	Anna Toynbee	50.00	
	Mathers Printing Co.	14.50	
	C. D. & P. Tel. Co.	4.18	
	F. L. Bowman	12.12	
26	P. C. Manley	9.30	
	T. F. Hansbarger	28.65	
	S. L. Dodd, Jr.	27.07	
	S. L. Dodd, Jr.	29.30	
	B. O. Woodford	15.80	
	G. L. Albright	16.70	
	C. S. Rowe	18.25	
30	B. O. Woodford	22.50	
	W. E. Rumsey	183.37	
	Anna Toynbee	50.00	14,000.31
Balance June 30, 1914.			.95

CROP PEST FUND.

1913		
June 30	Mathers Printing Co.	2.90
1914		
Feb. 1	W. E. Rumsey	7.23
June 27	T. F. Hansbarger	35.33
27	Guy G. Means	8.75
29	L. G. Zinn	15.85
	Earl Romine	8.65
	C. E. Myers	7.70
	S. L. Dodd, Jr.	21.55
	H. H. Greene	10.40
	Arthur Gold	18.55
	D. Brannon	5.10
	L. E. Reynolds	13.10
	D. E. Swisher	17.10
	R. M. Dalzell	26.50
	T. F. Hansbarger	22.60
	L. H. Wolford	22.10
	C. E. Riley	20.85
	L. V. Thompson	14.37
	J. A. Vandiver	19.79
	P. W. Dayton	20.27
30	S. L. Dodd, Jr.	36.00
	T. F. Hansbarger	75.00
	B. O. Woodford	22.50
	G. L. Albright	40.00
	C. S. Rowe	40.00
	Mathers Printing Co.	1.45
	A. C. McClurg Co.	7.40
	A. C. McClurg Co.	5.40

W. E. Rumsey.....	10.00	
W. E. Rumsey.....	66.57	\$ 623.01
Balance June 30, 1914.....		\$ 248.63

September 5, 1914.

The above statement of disbursements on account of San Jose Scale and Crop
Pest funds is correct.

*State Board of Control,*By J. S. LAKIN, *President.*

BULLETIN No. 1.**STATE CROP PEST LAW.****RULES AND REGULATIONS OF THE COMMISSION.****Act of 1913.**

AN ACT to prevent the introduction and spread and to provide for the control of the San Jose Scale and other dangerous insects and dangerously injurious plant diseases affecting nursery, orchard, forest and shade trees, shrubs, vines, cuttings, seeds and bulbs, or affecting plants or parts of plants of any kind or such as may harbor such injurious insect pests or plant diseases, and repealing chapter seventy-two of the acts of the Legislature of one thousand nine hundred and seven.

Appointment of State Entomologist and Formulation of Rules and Regulations by the Commission.

Sec. 1. That the director of the West Virginia Agricultural Experiment Station, the commissioner of agriculture, and the president of the West Virginia Horticultural Society are hereby created, ex-officio, a state crop pest commission with powers and duties as hereinafter provided. Said commission shall appoint the entomologist of the West Virginia Agricultural Experiment Station as state entomologist and plant pathologist, hereinafter called state entomologist, and such assistants as may be necessary, who shall, acting under the authority of said commission be charged with and perform such duties as are hereinafter specified. This state crop pest commission shall, from time to time, after due consideration, prepare a list of such dangerously injurious insect pests and diseases of plants affecting nursery, orchard, forest and shade trees, shrubs, vines, cuttings, seeds and bulbs, or affecting plants or parts of plants of any kind, or such plants or products of plants as may harbor such injurious insects or plant diseases, as may properly, within its judgment and the judgment of the state entomologist, be controlled or eradicated, and they shall cause such list to be published, along with particular specifications as to the nature and appearance of, and the manner in which said pests are generally disseminated. The state crop pest commission, shall at the same time, provide rules and regulations under which the state entomologist shall proceed to investigate, control, eradicate and prevent the dissemination of the said insect pests and plant diseases and to treat or destroy such plants or parts of plants or products of plants as may harbor such injurious insects and plant diseases, as far as may be possible, and these rules and regulations shall have the full force and effect of law so far as they conform to this act and the general laws of this state and of the United State; and any person, persons, firm or corporation who fails or refuses to comply with the orders or directions issued in writing under regulations provided by the state crop pest commission, shall, upon conviction thereof, be fined in the sum of not less than ten nor more than twenty-five dollars for each failure or refusal.

Regulations Concerning Transportation of Nursery Stock Within the State.

Sec. 2. The state crop pest commission shall have power to provide quarantine rules and regulations concerning the transportation and sale of all plants, or parts of plants, commonly known as nursery stock, within this state. They shall also have like power to provide like rules and regulations in regard to all plants or parts of plants commonly known as nursery stock, entering this state from without, and these rules and regulations shall be enforced by the state entomologist or his duly authorized assistants.

State Nursery Inspection and Regulations.

Sec. 3. It shall be the duty of this commission to provide for the annual inspection of all nursery stock grown within the state, prior to October first of each year by the state entomologist or his assistants, who shall issue a certificate stating the nursery to be apparently free from insect pests and plant diseases to the owners of all nurseries found entitled to the same, and it shall further provide regulations under which nursery stock brought into the state may be sold under the above provided certificates, and in accordance with the further provision of this act. It shall be unlawful after the promulgation of the rules and regulations provided for in this act for any person, persons, firm, corporation or common carrier to transport by land or water, plants or parts of plants commonly known as nursery stock, in violation of the same, and every such offense shall constitute a misdemeanor, and upon conviction thereof, the person, persons, firm or corporation, or common carrier so convicted shall be fined in the sum of not less than fifty dollars nor more than one hundred dollars for each and every violation of this act.

Treatment of Infested Plants.

Sec. 4. The state entomologist, or any of his assistants, or a local inspector as hereinafter provided, shall have power under the rules and regulations of said commission to determine the nature and method of the treatment to which any infested plants, parts of plants, or plants harboring dangerously injurious insects or plant diseases shall be subjected, and he shall report his findings in print or writing, giving reasons therefore, to the owner of the infested plants, his agents or tenants, and a copy of such report shall be submitted to the commission, and there shall accompany each and every such report specific directions as to the treatment of the infested plants, or parts of plants, or plants harboring such dangerously injurious insects or plant diseases, which directions may be in printing or writing. In case of objection to the finding of the state entomologist or an assistant or local inspector, an appeal shall lie to the said commission, whose decision shall be final; such appeal must be taken within seven days from the receipt of such report, and shall act as a stay of proceedings until it is heard and decided.

Execution of Prescribed Treatment.

Sec. 5. Upon the receipt of the report of the state entomologist, an assistant, or local inspector, the treatment prescribed shall be executed at once, unless appeal is taken, under the supervision of the state entomologist, an assistant, or local inspector, the cost of material and labor to be borne by the owner of the premises.

Infested Trees Marked and Owners Notified to Treat or Destroy Same.

Sec. 6. That should any of the officers aforesaid, through their assistants or employees, or by any notification whatsoever, find any trees, vines, shrubs, plants or parts of plants infested or diseased with, or harboring, insects or diseases published by the state crop pest commission as dangerously injurious, the aforesaid officers shall mark or tag in some conspicuous way all trees, vines, shrubs, plants or parts of plants infested with or harboring the aforesaid insects or diseases, and shall give notice in writing to the owner or owners, tenant or persons in charge of such premises of the conditions thereof; and thereupon, if such person or persons so notified, shall not within ten days after notification destroy or treat the same in accordance with the rules and regulations of the state crop pest commission, which regulations shall accompany said notice, a copy of which rules and regulations shall be sent upon application to any person, then the state crop pest commission shall, through its officers, assistants or employees destroy or treat all such trees, vines, shrubs, plants or parts of plants. Whenever any such infestation shall exist at any place, within or on the property of any non-resident, or on any property the owner or owners of which cannot be found within the county after diligent search by the state entomologist or his assistants or a local inspector, or on the property of any owner or owners upon whom the notice aforesaid has been served and who shall refuse or neglect to eradicate the same within the time specified, it shall be the duty of the state entomologist to cause said infestation to be at once removed by eradicating or destroying said plant disease or injurious insects, their eggs or larvæ, or by destroying any trees, vines, shrubs, plants or parts of plants harboring the same. The necessary expense thereof shall be paid by the owner or owners of the real estate from which said infestation has been removed in pursuance of this act. The state entomologist or his assistant or a local inspector shall serve or cause to be served upon said owner or any one in possession and in charge of such real estate, a notice stating the amount of said charge, and further stating that if said charge be not paid to the sheriff of the county wherein said real estate is located within twenty days from the date of the service of said notice, that the same shall become a lien upon the real estate. Copy of said notice, including the amount of said charge together with the proof of service shall be at once filed with the sheriff, and if said amount is not paid to the sheriff within the time therein stated, said amount shall become a lien on said real estate and shall be collected as delinquent taxes are collected, and said real estate shall be sold for the non-payment of said charges the

same as may now, or may hereafter be provided by law for sale of real estate for delinquent taxes, and the county court shall order the sheriff to pay such charges out of the general fund of said county; and when said amount is collected by the sheriff it shall be paid back into the general fund of said county. The sheriff shall forward to the state treasurer on the first of each month all amounts thus received. These amounts shall be paid into the general fund of the state crop pest commission.

Permission to Enter Upon Public or Private Property.

Sec. 7. The said crop pest commission, its agents or employes are hereby empowered with authority to enter upon any public or private premises for the purpose of inspecting, destroying or treating insects or plant diseases determined and published by the state crop pest commission to be dangerously injurious, or such trees, vines, shrubs, plants or parts of plants as may harbor such injurious insect pests or plant diseases as prescribed in section one of this act. Any person, persons, firm or corporation who shall obstruct or hinder it or its agents in the discharge of their duties shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than twenty dollars nor more than fifty dollars for each such offense.

Certification of Nursery Stock from Within and Without the State. Duties of Transportation Companies.

Sec. 8. It shall be unlawful to deliver or give away within the boundaries of this state plants or parts of plants commonly known as nursery stock which have not been duly inspected in accordance with the provisions of this act and do not carry plainly attached to each car load, box, bale or package a copy of a certificate as herein provided, except that in case of nursery stock shipped into the state from without, the state crop pest commission shall provide by regulation for the acceptance of proper certificates from other states, and when so accepted it shall issue an official tag designating the fact, which tag must be attached to all such shipments, but no nursery stock shall be sold or shipped under the certificate issued as provided herein that was not raised in the nursery for or to which the said certificate was issued until such stock has been duly examined as provided herein and found to be apparently free from any dangerously injurious insect pest or plant disease.

All transportation companies bringing nursery stock into this state shall immediately, upon receiving such consignment, notify the state entomologist of the fact that such consignment is in their possession or is enroute to some point within the state and give the names of the consignor and consignee, the point of shipment and the destination of such consignment, and the name of the transportation company bringing such stock and shall make such further report relative to such shipment as the state crop pest commission may from time to time require.

Each and every violation of this section shall constitute a misdemeanor and upon conviction thereof every person, persons, firm or corporation so convicted shall be fined in a sum not less than twenty-five dollars nor more than fifty dollars. This section shall not be so construed as to affect the action of common carriers in the transportation of nursery stock under the provision of interstate commerce.

Freeholders Petitions for Local Inspectors.

Sec. 9. Upon a petition signed by ten freeholders of any city, county or magisterial district, it shall be the duty of the state entomologist, in person or by an assistant, to make a preliminary investigation of the locality from which the petition is received, to ascertain if any trees or plants be infested with or harbor the insect known as the San Jose scale or any other dangerously injurious insects or plant diseases as determined by the state crop pest commission under section one of this act. If, upon such preliminary investigation, it shall appear that the San Jose scale or such other dangerously injurious insects or plant diseases as above mentioned are present in the territory examined, the state entomologist may appoint a local inspector, and order a full inspection of such city, county or magisterial district to discover and locate all infested premises; and the local inspector shall report the result of such further inspection to the owners of all infested premises and shall give notice to destroy or treat the same as provided in section six of this act.

Compensation of Local Inspectors, How Paid.

Sec. 10. The county court of any county or the city council of any city in which a local inspector has been appointed shall fix the compensation of such local inspector, whose pay, however, shall not in any case be less than two dollars for each day's work, and said local inspector shall file before the said county court or city council from time to time an itemized account of the expenses and costs incurred in the performance of his duties, and a statement of the days actually occupied in the performance of the duties hereinbefore prescribed, and the same shall be allowed him and paid as other claims against the county or city, not to exceed two hundred and fifty dollars in any one year; but the county court of any county or the council of any city, may pay any sum in excess of two hundred and fifty dollars which it may deem proper.

Execution of Recommendation by the State Entomologist.

Sec. 11. It shall be the duty of the state entomologist, either in person or by an assistant or local inspector to supervise and direct the execution of any recommendations made under the provisions of this act, and all expenses of treatment, control and eradication of any infested trees or plants shall be borne by the owner of the premises upon which the same are located as provided for in section four, five and six of this act.

Registration of Nurserymen.

Sec. 12. From and after the first day of July, one thousand nine hundred and thirteen, it shall be unlawful for any person, persons, firm or corporation either for himself or as agent for another to offer for sale, sell, deliver or give away within the bounds of this state, any plants or parts of plants commonly known as nursery stock, unless such person, persons, firm or corporation shall have first procured from the state auditor a certificate of registration which certificate shall contain such rules and regulations concerning the sale of nursery stock as the state crop pest commission may prescribe and be approved and countersigned by the state entomologist, who shall have full power, and is hereby authorized and required to cancel and withdraw any certificate upon satisfactory evidence that any rules and regulations governing the sale of nursery stock within this state have been violated by the holder of the same. The state auditor shall not issue any certificate of registration except upon the payment of the sum of five dollars and shall forward all certificates to the state entomologist for his approval before allowing the same to the party making application therefor, and all such certificates as may be granted shall expire and become null and void one year from the date of issue thereof, and any person, persons, firm or corporation either for himself or as an agent for another who shall sell, offer for sale, deliver or give away any plants or parts of plants commonly known as nursery stock without exhibiting a copy of the certificate of registration as herein provided for to each and every person to whom he shall sell, offer for sale, deliver or give away any such plants or parts of plants shall be deemed guilty of a misdemeanor and upon conviction thereof shall be punished by a fine or not less than twenty dollars nor more than one hundred dollars for each offense. It shall be the duty of the prosecuting attorney of the county wherein the offence is committed to prosecute all violations of this act and all amounts recovered as fines for violations of this act shall be paid over to the State treasury.

Disposal of Moneys Received by the State Auditor.

Sec. 13. The state auditor shall set aside and reserve all moneys coming into his hands in pursuance of the provisions of this act, and shall from time to time draw his warrant for the same in favor of the crop pest commission in payment of services and expenses incurred in the inspection of the various nurseries of the state and the inspection of nursery plants sold by agents representing nurseries from without this state.

Payment of Charges Against the State Crop Pest Commission.

Sec. 14. All charges against any appropriations for or funds of the state crop pest commission shall be upon properly itemized vouchers, as may be prescribed by the state board of control, and shall be certified by the director of the West Virginia Agricultural Experiment Station, who shall be chairman of the state crop pest commission, and by the state

board of control. The said commission shall cause to be made a biennial report to the governor of the state giving in detail its operations and expenditures under this act, on or before December first of each year, and it shall be the duty of the state printer to print the same in such numbers as the governor may direct and the cost of such printing shall be paid out of the general printing fund of the state.

Repeal of Chapter Seventy-two.

Sec. 15. Chapter seventy-two of the acts of one thousand nine hundred and seven, known as the San Jose scale law, and all other acts or parts of acts inconsistent with this act are hereby repealed.

Passed February 21, 1913. To take effect from its passage.

Approved by the Governor, February 26, 1913.

RULES AND REGULATIONS OF THE WEST VIRGINIA STATE CROP PEST COMMISSION.

In accordance with the foregoing Act of the West Virginia Legislature passed on February 21, 1913, the following rules and regulations governing the operations of said Act are herewith adopted and promulgated by the West Virginia State Crop Pest Commission.

List of Insects and Plant Diseases.

1. The following insects and plant diseases are considered as dangerously injurious to nursery stock, orchard, forest and shade trees, shrubs, vines, cuttings, seeds or bulbs within the meaning of the aforesaid Act.

Insects:

San Jose scale (*Aspidiotus perniciosus* Comstk.)
West India peach scale (*Aulacaspis pentagona* Targ.)
Wooly apple aphid (*Schizoneura lanigera* Haus.). In nurseries only.
Peach tree borer (*Sanninoides exitiosa* Say.). In nurseries only.
Brown-tail moth (*Euproctis chrysorrhoea* Linn.)
Gipsy moth (*Porthetria dispar* Linn.)

Plant Diseases:

Crown gall (*Pseudomonas tumefaciens* Smith & Townd.)
Black knot (*Plowrightia morbosa* (Schw.) Sacc.)
Peach yellows.
Peach rosette.
Little peach.
Fire blight (*Bacillus amylovorus* (Burr.) DeToni.) In nurseries only
White pine rust (*Peridermium strobi* Klebahn.)
Chestnut bark disease (*Diaporthe parasitica* Murr.)
Cedar rust (*Gymnosporangium macropus* Peck.)
Potato wart disease (*Spongospra subterranea* (Wallroth) Jones.)

The commission reserves the right to alter, amend, and change this list from time to time as may be deemed expedient. Insects and plant diseases other than those mentioned in the aforesaid list which are not ordinarily dangerously injurious will be so considered whenever they occur abundantly enough to damage the health of trees or plants.

Quarantine Against Diseased Nursery Stock Within the State.

2. After July 1st, 1913, it shall be unlawful for any person, persons, firm, or corporations to sell, transport, or give away any trees, or other plants commonly known as nursery stock when infested with the San Jose scale, wooly apple-aphid, peach-tree borer, West India peach scale, gipsy moth, or brown-tail moth; or infested by crown gall, peach yellows, peach rosette, little peach, black knot, fire blight of apple and pear, cedar rust of apple, white pine rust, or the chestnut bark disease; or when dangerously infested with any other insect pest or plant disease.

Concerning Infested Nursery Premises.

3. If, upon inspection, any nursery premises within the State prove to be infested or affected by any one, or more, of the insects or plant diseases specified in section 1 of these rules and regulations, the owner, or owners shall not be entitled to a certificate until said owner, or owners shall have satisfactorily carried out the directions of the state entomologist for destroying or eradicating the trouble.

Notice is hereby given that any person, persons, firm, or corporation, doing business in this state as growers or handlers of nursery stock must not sell, transport, or give away the same unless accompanied by a certificate of inspection from the state entomologist setting forth the fact that said stock is apparently free from dangerously injurious insects or plant diseases.

Inspection Certificates from Other States.

4. All nursery stock entering this State from without must be accompanied by a certificate of inspection, satisfactory to the state entomologist, both as to form and the authority of the person making the same, which certificate shall certify substantially as above required in the case of nurseries within this State. As a guide to transportation companies as to whether a certificate is valid or not under this law, the state entomologist shall furnish to all nurserymen in other states or countries, doing business in this State, upon their request, official permit tags provided that the certificate of inspection of the person, persons, firms or corporations, applying for the same is found to be correct and in proper form and the said person, persons, firm, or corporation shall have procured the state certificate of registration as required in section 12 of the Act of the Legislature of 1913. These permit tags shall be sold at cost.

Transportation of Nursery Stock.

5. All transportation companies doing business in this State, both by land and water routes, are hereby notified that on and after July 1st, 1913, they must not, under penalty prescribed in section 3 of above act, transport plants, commonly known as nursery stock, within the bounds of this state, to be delivered at any point therein, except the same are accompanied by, and have plainly attached thereto, a certificate as provided for in section 6 of these rules, and in case of nursery stock entering this State from without for delivery in the State, such nursery stock must carry in addition to the official certificate of the state whence the shipment originated, the official permit of the State Entomologist of West Virginia, as specified in section 4 above.

Inspection and Certification of Nurseries.

6. It shall be the duty of the state entomologist, or his assistant, to inspect all nursery premises in this State at least once each year prior to October first, and to issue to each a certificate in proper form if

found entitled to the same. On the discovery of any infested nursery, the state entomologist shall pursue such methods as are necessary to eradicate the injurious insects and plant diseases specified in section 1 of these rules and regulations, and when accomplished a certificate shall be issued in due form. Certificates of nursery inspection shall in all cases be signed by the state entomologist. The state entomologist is hereby authorized to grant special certificates to dealers in nursery plants, upon satisfactory evidence that they are handling only properly inspected stock.

Re-sale of Nursery Stock Purchased from Other States or Countries.

7. All nursery stock imported into this State for re-sale shall be inspected by the state entomologist, or his assistant, and if found free from dangerously injurious insects or plant diseases, it may be sold and shipped under the certificate of the state entomologist as provided for under these rules.

Whenever nurserymen, or others, purchase nursery stock from other states, or countries for re-sale they shall notify the state entomologist as soon as the nursery stock has been received, and they shall not unpack said nursery stock until a reasonable time has elapsed for the state entomologist, or his assistant, to make an inspection. Upon receiving notice of the arrival of any imported nursery stock it shall be the duty of the state entomologist, or one of his inspectors, to immediately examine such nursery stock.

Local Inspection for San Jose Scale, Peach Yellows, Black Knot, etc.

8. The state entomologist is hereby directed to furnish to the authorities of each city and county, as promptly as may be, a full statement of the conditions prevailing in the several cities and counties of the State as shown by the records of the State Crop Pest Commission, in relation to the infestation of orchards and gardens with the San Jose scale, peach yellows, black knot and any other dangerously injurious insects or plant diseases which may occur as set forth in section 1 of the Acts of the Legislature of 1913. He is also directed to furnish the same statement to all interested individuals in the several cities and counties of the State who may apply therefor, to the end that those who are concerned in the protection of the fruit industry from the ravages of these insect pests and plant diseases may take such action under the provisions of the State Crop Pest Law as they deem necessary. When a sufficient number of the freeholders of any city, county or magisterial district petition for a local inspection as provided for in section 9 of the State Crop Pest Law, the state entomologist is directed to satisfy himself as to the needs of inspection in the community of which the petitioners are residents, either by making an investigation in person or by an assistant; or by consultation of the records in the office of the State Crop Pest Commission, and to proceed, in conjunction with the proper local authorities and the petitioning freeholders, to execute the law as fully as is practicable.

Appointment of Local Inspectors.

9. In the appointment of local inspectors, as provided in section 9 of the State Crop Pest Law, the state entomologist is directed to advise with the local people as to their wishes in this matter, and to satisfy himself, by examination, that the persons selected for appointment are competent to execute the work required in an accurate and proper manner before issuing commissions to them. Local inspector's authorizations shall be revocable at any time by the state entomologist whenever the person holding the same does not appear to be accomplishing the work for which he has been appointed.

Examination of Local Inspectors.

10. The state entomologist shall in person examine all candidates for the position of local inspectors as to their fitness for such work before appointing them.

Once each year, after receiving their authorizations, all local inspectors shall spend at least five days at the West Virginia Agricultural Experiment Station for the purpose of familiarizing themselves with all the details of their work and to receive instruction concerning insect pests and plant diseases.

Duties of Local Inspectors.

11. The state entomologist shall provide forms of records to be kept concerning all the premises inspected, and a special form of report concerning each and every premise found to be infested, which records of infested premises shall be made out in duplicate by the local inspector, and one copy filed with the state entomologist, and the other filed with the clerk of the city council or the clerk of the county court of the county, of whatever city or county he may be serving as local inspector. The local inspector shall, in the manner directed by the state entomologist, tag or mark infested trees and plants so that the same may be readily recognized, but he shall in no wise issue orders concerning the treatment of infested premises until he has submitted the report of the inspection of the same to the state entomologist and has received from him a confirmation as to the statement made in his report; and has been directed by the state entomologist as to the action that he shall take in regard to any case of infestation.

Recommendation as to Treatment of Infested Plants.

12. Upon receipt of the reports of local inspectors, the state entomologist shall issue at once directions to all those persons having infested premises, specifying precisely the nature and manner of treatment to be pursued in order to control and eradicate the San Jose scale, peach yellows, or black knot, or any other dangerously injurious insects or plant diseases which may occur as set forth in section 1 of the Act of the Legislature of 1913. In each and every recommendation particular specifications shall be given as to the materials to be used and the manner of their application, or measures to be adopted, and a

copy of each such recommendation shall be furnished the local inspector for his guidance in executing the further directions which may become necessary for the state entomologist to send him. The local inspectors shall report in full once each week to the state entomologist, and shall report once a month to the city council or the county court of the city or county for which they are appointed, and shall submit a journal showing the premises inspected each day, with such general data concerning the same as directed by the state entomologist, and, as above directed, furnish duplicate copies of reports upon each infested premise. Upon vacation of his office by a local inspector for any cause, he shall turn over to the city council or county court the duplicate copies of all recommendations issued by the state entomologist.

Treatment Prescribed by the State Entomologist.

13. The state entomologist is hereby directed to prescribe the nature and method of treatment of all plants whatsoever affected by the insect pests or plant diseases specified in section 1 of these regulations, and he is hereby charged with such investigations as to the nature and habits of these insects and plant diseases and the remedial measures therefor, as will enable him to give the best possible service to the people.

Appeal from Orders of an Inspector.

14. Any appeal from the orders or directions of an officer acting under this commission in dealing with the subjects specified in sections 4, 8, 11 and 12, of these regulations shall be made in writing, and shall be addressed to the chairman of the commission within seven days upon receipt of a written order to destroy or treat plants as specified under sections 8, 11 and 12 of these regulations. The person, persons, firm or corporation making an appeal shall be granted a speedy hearing by the State Crop Pest Commission, and accorded every opportunity to introduce material evidence relating to the facts alleged in the order of the officer requiring the destruction or treatment of plants.

Supplement to Bulletin No. 1 (Vol. 1, No. 1).

WEST VIRGINIA STATE CROP PEST COMMISSION.

Rules and Regulations.

RULE 15—Wherever cedar trees are found which bear cedar "apples" or "balls," a stage of the cedar rust (*Gymnosporangium macropus* Peck) a disease dangerous to apples and listed by this commission as a dangerously injurious disease (See Rule 1), and which are within one mile of apple orchards or are so situated as to be a menace to such orchards in the judgment of the state entomologist, the state entomologist shall require the owners of such cedar trees to remove such cedar balls or to destroy such cedar trees, and upon the failure of the owner so to do the state entomologist shall proceed to eradicate such disease by destroying said cedar apples or balls, or by destroying such trees, at his option, as provided in section 6, chapter

14, Acts of 1913; and in the event that it becomes necessary to destroy such cedars at the time when the spores of said disease may be transmitted to the apple, then the owner or the state entomologist, whoever shall cut the same, shall cut and burn all branches and foliage bearing the cedar "apples" or "balls."

All power and authority to make such additional directions and prescribe additional methods of treatment is given to the state entomologist; and this rule is to be regarded as an enlargement of the power given the Entomologist.

RULE 16.—That after the notification by mail or otherwise to the person or persons as prescribed in rule 12, then at any time thereafter the state entomologist may officially notify the owner or tenant or person in charge of the premises to eradicate or treat the insect or disease or destroy the affected plants, trees, etc., in such manner as the state entomologist may prescribe, within the time prescribed by law. Should the person fail, refuse or neglect to carry out the directions of the state entomologist, then he shall have the right and authority to exercise the power given by section 6, chapter 14, of the Acts of 1913, and treat or destroy the same.

In order to exercise the right of inspection, marking, tagging, etc., prescribed in the aforesaid act, the state entomologist, or his assistants, or any person he may empower, either local inspectors or others, shall have the right to enter upon the premises of any person or persons they may deem necessary to carry out, in good faith, their duties under the act aforesaid.

From any notice or order made by the state entomologist the right of appeal shall be given to any person affected thereby, in accordance with the provisions of the act aforesaid.

The above rules and regulations were adopted by the Commission February 19, 1914, and amend the rules and regulations previously adopted by the Commission in Bulletin 1, West Virginia State Crop Pest Commission.

E. D. SANDERSON, Chairman.

Bulletin No. 2 (Vol 1, No. 2)

ORCHARD INSPECTION

APPLE RUST

CHESTNUT BARK DISEASE

Inspection of Orchards and Other Premises.

In order to carry out certain provisions of chapter 14, Acts of the West Virginia Legislature of 1913, known as the State Crop Pest Law, local inspectors have been placed in counties from which petitions, signed by ten freeholders, have been received by the State Crop Pest Commission asking for such work. As a rule these petitions have come from the principal fruit growing sections of the state, or from those counties in which this industry is now developing.

The men appointed for this work are all of mature years, selected with care and each assigned to the territory where his natural ability and training would be best suited for the work in that particular section. While the inspection work is similar in the main, the prevalence of some relatively new plant diseases in certain localities requires special attention, and a man to do the work who has, besides his training, ability and natural aptitude to overcome the prejudices and unbelief of the people concerning the life history and destructive effect of such diseases. These points, together with the most practical methods of control, must be made so plain to the uninformed that not only will such parties become interested in the subject under consideration but also see that by their assistance in fighting these troubles the community, the county, and the state will be benefited.

During the past summer eighteen inspectors were appointed by the Crop Pest Commission and placed in the field. Thirteen of these are orchard inspectors and the other five are employed in the chestnut blight investigation.

Orchard Inspectors.

Name.	Home Address.	Territory Assigned.
Edward Behrens.....	Sherrard, W. Va.....	Brooke and Hancock counties
H. L. Crane.....	Morgantown, W. Va.....	Harrison and Upshur counties
P. W. Dayton.....	Pinto, Md.....	Mineral county
R. H. Gist.....	Wellsburg, W. Va.....	Marshall county
T. F. Hansbarger.....	Peterstown, W. Va.....	Morgan county
Percy C. Manley.....	Monongah, W. Va.....	Jefferson county
R. W. Muldoon.....	Morgantown, W. Va.....	Wetzel county
A. K. Perry.....	Junior, W. Va.....	Berkeley county
L. E. Reynolds.....	Grape Island, W. Va.....	Wood county
E. Lowry Scott.....	Grandview, W. Va.....	Raleigh county
D. E. Swisher.....	South Branch, W. Va.....	Grant and Hardy counties
E. A. Tuckwiller.....	Lewisburg, W. Va.....	Preston county
L. H. Wolford.....	Fordhill, W. Va.....	Hampshire county

Chestnut Blight Inspectors.

Name.	Home Address.	Territory Assigned.
C. L. Brooks.....	Buckhannon, W. Va.....	Eastern part of State
J. Wesley Stitler.....	Martinsburg, W. Va.....	Eastern part of State
C. J. DeHaven.....	Martinsburg, W. Va.....	Eastern part of State
C. G. DeHaven.....	Hengary, W. Va.....	Eastern part of State
E. W. Miller.....	Gerrardstown, W. Va.....	Eastern part of State

Policy of the Commission Concerning Inspection Work.

Education and co-operation are the best and surest methods by which the state or nation can assist its people in checking the ravages of dangerously injurious insects and diseases. First the people must be convinced that certain insects or diseases are injuring or destroying their domestic animals, farm crops or orchards, and this can be done in no other way except by education. Having accomplished this end co-operation of a majority of the rural population is assured. This policy of carrying on inspection work has proved the most effective method adopted by the state, years ago, in its fight against the San Jose scale.

Apple Rust and Chestnut Blight.

In the eastern part of the state, particularly in Berkeley and Jefferson counties, a disease of apple trees, commonly known as apple rust or "cedar rust" has recently become exceedingly prevalent owing to the great number of certain commercial varieties being planted and the abundance of the common red cedar in this section. In this part of the state the people are at present well informed concerning the San Jose scale, black knot, and peach yellows; therefore, most of the time of the local inspectors here is being spent in an educational campaign concerning the apple rust, teaching the people its life cycle; the part the cedar trees play in its development; its injury to both the apple tree and its fruit; how the disease spreads; and the best method of checking or preventing its ravages. The subject of apple rust is treated in another part of this bulletin by Mr. N. J. Giddings, Plant Pathologist of the West Virginia Agricultural Experiment Station. Mr. Giddings gives a plain statement of facts concerning the life history of this disease and the one sure way of preventing damage by it to the apple trees and apple crops in the red cedar belt.

Another plant disease which comes under the scope of the State Crop Pest Commission is also getting a foothold in the eastern part of the state, and is threatening the valuable chestnut timber with destruction. This new trouble is known as the chestnut bark disease, and within the last few years, has destroyed practically all the chestnut trees in New Jersey, Delaware, southern New York, eastern part of Pennsylvania, in a large part of Maryland and northern Virginia. An article relating to the character of this disease and methods of control will be found elsewhere in this bulletin by Mr. A. B. Brooks, Forester to the State Crop Pest Commission.

Enforcement of the Crop Pest Law.

The State Crop Pest Law gives the commission power to enter upon private or public premises and treat or destroy trees, shrubs, plants or vines that harbor dangerously injurious insects or plant diseases if the owner of such infested premises fail to do so after the property has been inspected by the state entomologist, his assistant or a local inspector, and legal notice has been sent to the owner to treat or destroy within a specified time. However, it is thought best, as already stated, to work for co-operation among the general farmers and fruit growers, and thereby reach the desired end peacefully and with the good will of the majority rather than to enforce the law at once, thus getting the enmity of many and stirring up contention between the parties where co-operation should prevail. After all the resources of a peaceable nature have been exhausted in trying to accomplish the object in view there will be plenty of opportunity to resort to the law.

How to Secure the Most Good Through Inspection Laws.

The inspection of orchards and other premises is but the first step in the work to be done by the Crop Pest Commission in its endeavor to assist the people of the state in their fight against dangerously injurious insects and plant diseases which attack the crops of the farmers and fruit growers. This work must be followed up by giving the people instruction concerning the most effective means of checking these troubles and showing them as far as possible how to apply the remedies and preventives for the different kinds of insects and plant diseases. In carrying out this phase of the work one often finds people of a negligent and forgetful disposition and the suggestions given by the inspectors are overlooked and therefore trees badly infested with insects or diseases are allowed to remain without being either treated or destroyed, to the menace of healthy orchards in the neighborhood. People of this character need to be often reminded of the duty they owe to themselves and their neighbors in order that the most possible good to the community can be accomplished.

Heretofore, owing largely to lack of funds, inspection work under the old San Jose scale law did not reach the desired end in some localities of the state, from the fact that the inspection was not followed up as it should have been. Under the new law the money furnished by the county courts for the inspection will enable the Commission to carry on the work to completion. This will be done by giving all the information and assistance possible concerning the treatment of insects and plant diseases, and by reminding negligent people of their duty in this matter. Where necessary, trees, vines, shrubs or plants that harbor dangerously injurious insects or plant diseases will be treated or destroyed by the Commission in accordance with the State Crop Pest Law.

RUST OF APPLE.

By N. J. Giddings.

Introduction and History.

The rust of apple commonly spoken of as cedar rust has received a great deal of attention during the past three or four years. This is not surprising, in view of the fact that as a result of its ravages since 1909 the apple growers of West Virginia have sustained losses which will easily amount to a million dollars. The injury resulting from infected fruit is quite serious, the small size and poor quality of fruit on badly infected trees make a great reduction in the amount of crop and its value, while another item of vast importance is the lowered vitality of trees which suffer from the disease. In sections where the rust is prevalent, some orchardists have been heard to remark that their York Imperial trees, which are especially susceptible to this disease, did not seem to do well at all, while some other varieties were thriving. It is hardly possible for the trees to do more than live over from year to year when most of the energy they should put into new growth and fruit production is absorbed by the fungus which produces rust on the leaves and fruit.

Every orchardist who has given this problem serious consideration must realize that cedar trees in the vicinity of apple orchards are directly responsible for the destructive outbreaks of apple rust. During 1888 the United States Department of Agriculture published a very complete article on this disease and the relationship existing between the rust of apple, and the galls on cedar trees, commonly known as cedar apples. Some fifteen years ago one citizen of Martinsburg cut down some stately cedar trees in his front yard because he thought that they were injuring his apple orchard in some way. These instances are cited to show that apple rust has been known to both scientific men and to orchardists for a considerable number of years. It has sprung into greater prominence recently because weather conditions have been particularly favorable to its development, and because there have been great numbers of apple trees of susceptible varieties planted out in close proximity to cedar trees.

Life History of the Fungus and Relation of Cedar Trees to Rust in Apple Orchards.

The fungus which causes apple rust spends about seven-eighths of its life cycle on the cedar tree and only about one-eighth on the apple. The apple leaves usually become infected some time during May, and by late June the yellow spots on the leaves have become very noticeable. During July and August little tube-like growths are formed from the lower surface of these spots and spores are produced in them. These spores will immediately infect any red cedar trees to which they may be carried under favorable conditions. Visible evidence of this cedar infection is not to be seen until about June of the following year. At that time one may find the little brown or greenish galls, known as



Fig. 19. Cedar Apples Photographed just After a Rain.

cedar apples, just beginning to swell on the twigs of the cedar. By late July or August they are quite noticeable, and in late autumn many small depressions may be seen on the larger cedar apples. It is from these little depressions that the gelatinous spore masses come out as spongy fingers on the cedar apples in the spring, and again spread the rust infection to the fruit and foliage of apple trees. Two years are required for the complete development of the fungus upon both cedar and apple, and about twenty-one months of that time is spent with the cedar as a host. In some instances the fungus even continues to live for another year on the cedar and produces spores for apple infection on two successive springs. From the above facts it will be easily seen that the cedar tree plays a most important part in the life history of the apple rust fungus. It should also be noted that the fungus has established itself so that the disease may cause serious injury to apples every season, if conditions are favorable. This possibility has been brought about by the fungus occasionally shedding spores from the cedar apples on two successive seasons.

The cedar trees are not the cause of the disease, but the fungus which produces it lives over from year to year on them. If a person harbors a criminal he is likely to get into trouble, even though he is unaware of the evil in his guest. The cedar trees provide shelter and food for the apple rust fungus at times when it can secure such things from no other source. Since the cedars are of practically no commercial value in West Virginia, and the apple orchards are a great source of income in many sections, it seems only reasonable that the former should be destroyed when they are harboring this destructive disease within range of valuable orchard property. It has been demonstrated in West Virginia and in other states that removal of cedar trees in the vicinity of apple orchards puts an end to losses from the apple rust disease. A number of orchardists in Berkeley county who suffered heavily from the rust last year are reporting that the disease is of little importance in their orchards this season as they have cleaned up all or most of the cedar trees in their immediate vicinity. One man who has been greatly troubled by apple rust for a number of years, wrote to the Experiment Station stating that he had managed to get all the cedar trees near his orchard cut, except on one side and that the rust in his apple orchard was much worse on that side than anywhere else. Numerous examples of a similar character might be cited but it is better to see them than to hear about them. One other case which is well worthy of note is an orchard near Bunker Hill where the rust was very severe during 1912. There was a large cedar grove on one side of this orchard and a strong wind drove the rust spores into the apple trees so that the infection was more severe on the side next to the grove. The fruit on the badly infected side of those trees was little if any more than half as large as that on the other side, and as further proof of the weakening effect of the rust on the apple trees, it was noted this spring, (1913) that these trees had no bloom on the side next to the cedar grove, while there was abundant bloom on the other side.

Resistance of Varieties.

Some varieties of apples are far more susceptible to the rust than others. Among those which are most seriously affected, are the Rome Beauty, York Imperial, Smokehouse, and Rambo. The Ben Davis frequently shows a considerable amount of infection, but the actual injury does not seem to be so serious upon that variety. Grimes Golden, Northwestern Greening, Winesap, and Blacktwig, are quite resistant, though the rust may be found upon any of them. The commercial orchardist should not hesitate about planting susceptible varieties, if they are the ones best suited to his purpose, but he should look after the cedar trees and see that there are none left where they will cause serious infection.

Methods of Control.

Spraying is not a very effective remedy against the apple rust. Experiments along this line have been conducted at various times and in several states, but the results have generally been unsatisfactory. The West Virginia Experiment Station has conducted a very extensive series of tests, to determine the practicability of spraying to control this disease. The facts which are brought out by this work thus far are: First, that the disease may be controlled by thorough spraying at the proper time with any of the spray materials commonly used in orchard practice; second, that the time when effective spraying may be done is limited to two or three days, and that for complete protection the time of effective application is restricted to one or possibly two days; third, that a very complete knowledge of the habits of the fungus and of its relation to weather conditions is necessary in order to determine the proper time for spraying, with any degree of reliability; fourth, that one such special spray application may not be sufficient to control the disease, as there may be two or more periods of infection; and fifth, that the most severe infection usually takes place at or about blossoming time.

It would be very hard to find a commercial orchardist who would care to undertake a spraying program which presents so many difficulties, if there was any other way to handle the problem. There is another way in the case of the apple rust, and it is the destruction of the cedars—all the cedars—within a radius of about a mile of such orchards. This treatment will look like an endless task to some, but others have gone ahead and proven that it is both practical and economical, even where the cedar trees are quite numerous. There are indeed many cases where the removal of scrubby cedars from land will add enough to its value, either as forest lot or as pasture, to more than pay for their removal.

Sometimes a man will say that there are no cedars near his orchard but that the trees are suffering from rust. Such a case has never yet been found to bear investigation. While there may be no large cedar trees near such an orchard, there are at least some small ones either near it or in it. Orchards have been examined in Berkeley County

which actually contained young cedar trees, although the cedar had been pretty well cleaned out around them. It is all right to get rid of the big trees first, but the little fellows must not be neglected, and it would be a much better plan to destroy them all at once. Some young trees will continue to come up from seed for a while, but they are easily handled, and will soon cease to be in evidence if a little care is taken to watch for them. The cedar is a tree which does not sprout up from the roots, so that there is no danger of reproduction by that method.

CHESTNUT BLIGHT AND ITS CONTROL IN WEST VIRGINIA.*

By A. B. Brooks.

Along with the recent vigorous cutting and destruction of our crop of timber in West Virginia there has been a corresponding increase in value of all forest products. In view of this fact, it has become the duty of the state to adopt vigorous measures for the protection of the remaining



Fig. 20. Fruiting Bodies of Chestnut Bark Disease Fungus on Body of Chestnut Tree.

timber, not only from fires, but also from such losses as are suffered through the attack of insects and fungous diseases.

The Chestnut Blight Fungus.

Chestnut blight, one of the most serious fungous diseases that has appeared in the United States, attacks only the bark of chestnut and chinquapin, except in rare cases, the spores of the disease usually gaining entrance at some injured place on the trunk. Squirrels, as well as other animals, birds, and insects, are frequently responsible for the spread of the disease by injuring the tender bark of twigs and young trees and by carrying masses of spores from place to place. Trees of all ages are attacked by the blight and death results from the killing of the bark in the form of a girdle around the trunk or limb.

*For additional information on chestnut blight see Bulletin No. 137, "The Chestnut Bark Disease" by N. J. Giddings, issued March, 1912, by the West Virginia Agricultural Experiment Station, Morgantown, West Virginia.

It is not difficult to recognize the blight when found on live trees. The yellow or reddish spots of fungus on the smooth bark of young trees are readily seen in winter and summer. On old trees with rough bark the fruiting bodies of the fungus appear between the ridges of bark. The leaves on branches or trees that have been killed during the spring or summer wither up and hang on for several months, thus furnishing a conspicuous guide to infections.

The disease made its appearance on Long Island, N. Y., about nine years ago, killing first the chestnut trees of the parks located in the region of New York City, and afterwards spreading to distant points. At this date the disease is distributed as far as Vermont, western Pennsylvania and North Carolina. In large sections of New York, Connecticut, Massachusetts, New Jersey, Delaware, Pennsylvania, and Maryland, the chestnut trees are practically all killed. Outside of these areas there are spot infections of various sizes.

The sudden appearance of a new and extremely destructive disease is always a matter of great concern. This disease is of particular interest as there seems to be no record of its previous occurrence either in Europe or America. Some authorities have claimed that the fungus was imported from Europe and found our American conditions such that it developed as an active parasite upon the chestnut here. Others asserted that the fungus was a native species which had been existing previously as a harmless saprophyte, but, under favorable conditions, had suddenly become an active parasite. The problem appears to have been solved by officials of the United States Department of Agriculture who have recently discovered the same disease in China.* It appears to have been established there for many years but their chestnut trees seem to be resistant and it has not shown itself seriously destructive. Undoubtedly it was imported to this country from China.

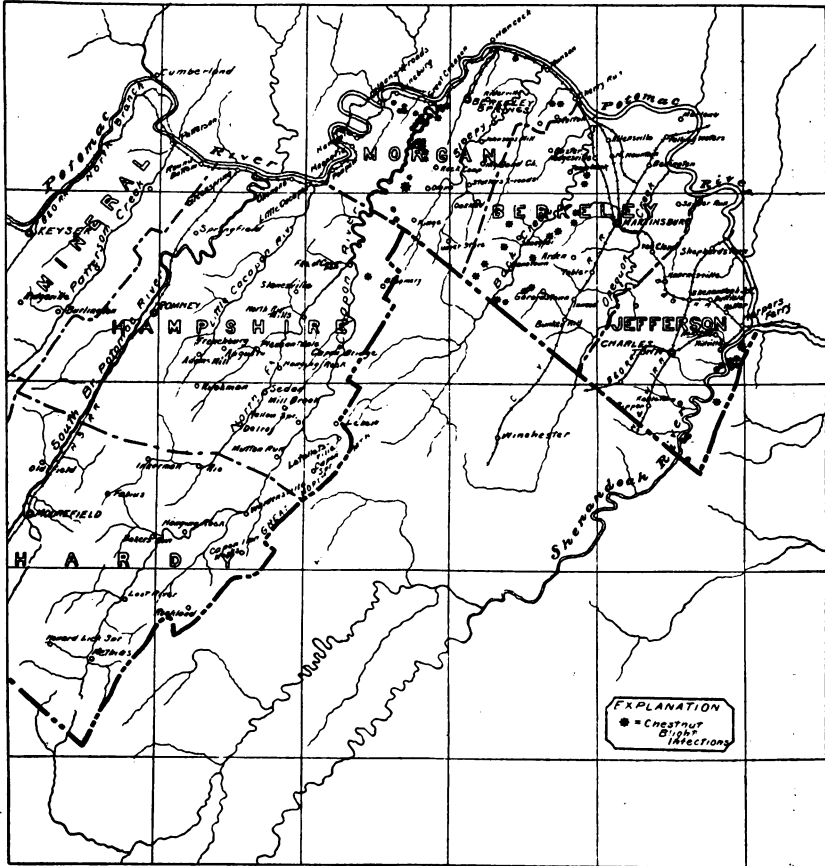
Distribution in West Virginia.

Prior to October, 1912, chestnut blight had been reported from three localities in West Virginia, namely, White Sulphur Springs, Greenbrier county, Whetsel, Preston county, and Pickens, Randolph county. Diligent search has been made recently at the first two places named, but none of the disease has been found. This leads to the belief that the specimens picked up by a summer visitor at White Sulphur Springs and by a tourist at Whetsel were of a nearly related fungus. That reported from Pickens was found to have been introduced on ornamental trees from a Philadelphia nursery. The small dying trees at this place were destroyed before the disease had opportunity to spread to the nearby native chestnut timber.

In the fall of 1912 two men were appointed agents of the Bureau of Plant Industry to investigate the distribution of chestnut blight in this state. A somewhat hurried search was first made in Jefferson county and about a dozen infections were located, principally on the west face of the Blue Ridge Mountains. These infections are scattered at

*See article in "Science," August 29, 1913.

intervals from a point about three miles south of Harpers Ferry to the Clark county, Virginia, line and from the west bank of the Shenandoah River one mile above the town of Millville, W. Va., to the summit of the Blue Ridge. The number of diseased trees in these infections varies from one to over three hundred. The infections found in Berkeley county now number more than twenty. All are small, however, including from four to a dozen trees, and are distributed principally along Little North Mountain, and in the valley of Back Creek. The greatest



Map showing present distribution of the chestnut bark disease in West Virginia as far as known.

number and largest of the diseased areas are located in Morgan county. A few small and rather widely separated infections have been found in the northeastern portion of the county, not far from the Potomac River, but the most serious ones on the west slope of Great Cacapon Mountain, where more than five hundred trees in each of two infections are found to be dying. Besides these a number of smaller ones are found at intervals from near Great Cacapon Station to the Hampshire

county line. Westward from here the disease has spread to a point near Orleans Roads on the B. & O. railroad, and at intermediate points several small spots have been located. The blight has recently been observed also in northeastern Hampshire county, whence it has doubtless spread from the larger infections on the north.

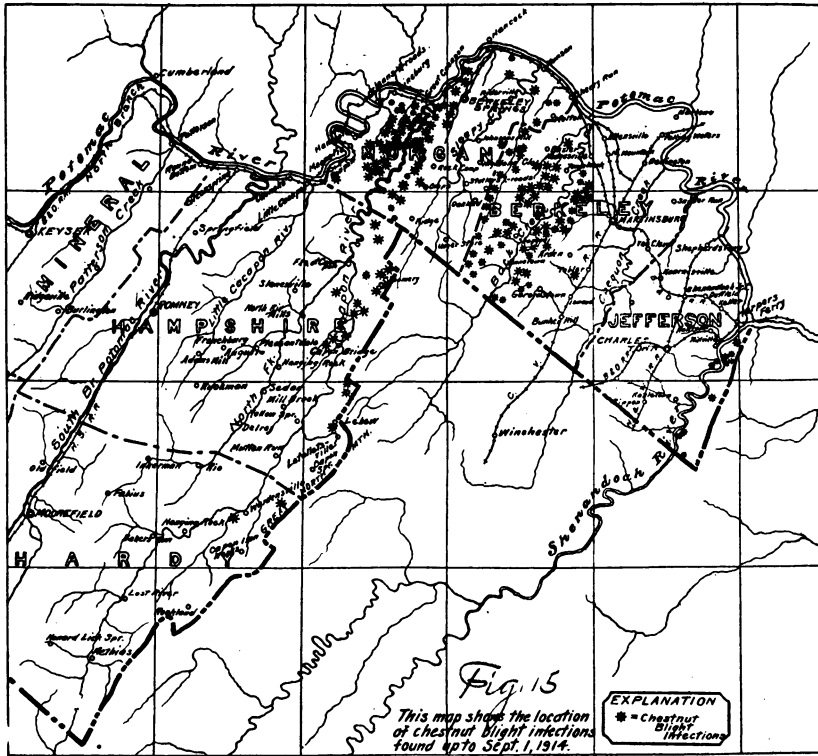
Without doubt several small spots of blight occur now outside of the areas mentioned above. The regions where chestnut timber grows, however, has been examined—though often in haste—along the northern border of the state from Monongalia county to Jefferson county, and it is reasonably certain that no large infections, at least, occur outside of the three or four easternmost counties.

Of the sections not yet diseased it is probable that parts of Preston county are in greatest danger on account of a nearby large infected area in Somerset county, Pennsylvania.

Control of Blight.

Experiments to determine methods for the control of chestnut blight conducted by experts of the U. S. Department of Agriculture and of the Pennsylvania Chestnut Blight Commission have been so extensive and thorough that those now in charge of the eradication of this disease need not consume time and money in making further tests. In cases where the blight has attacked valuable ornamental or shade trees it may be possible to save them by careful tree surgery, and subsequent infections may be prevented by spraying with bordeaux mixture. The diseased trees that stand in the forest, however, must be cut down and their diseased parts burned. The process of eradication in this way is as follows: The bark on the trunk is first peeled to the surface of the ground from a point above where the tree is to be cut. The tree is then felled and if worthless is cut in pieces of a size that can be handled and burned, the greatest care being taken to gather up every fragment that contains the fungus. If the trunk is valuable it is peeled and only the bark is burned, with such parts as are diseased. The trunk thus treated is as valuable as that of any other chestnut tree provided it has not been dead too long. Sprouts that come up around stumps where blighted trees have been cut often become infected from diseased portions of bark left on roots near the surface of the ground unless the stumps are thoroughly burned or painted with creosote. The trunks or bark of the blighted trees may be piled on their stumps and burned, but the burning must be thorough if effective. It has been found more economical to use creosote in most cases.

It is proposed to proceed along the following lines in the eradication of chestnut blight in West Virginia: The infections that have already been located will be visited, and an experienced cutter employed by the State Crop Pest Commission will assist the owners in destroying their diseased trees, or such parts as are affected, according to the method outlined above. In advance of this work a number of scouts employed by the Federal government and by the State Commissioner of Agriculture in collecting statistics relative to the distribution of the blight, will search for new infections. Every reasonable means will be em-



played for securing the co-operation of owners in destroying the blight, but in cases of failure to secure this, the trees will be cut according to the provisions of the recently enacted Crop Pest Law.

The diseased areas in Berkeley and Morgan counties are considered most dangerous because they lie closest to the valuable chestnut timber sections of the state, and for this reason will be looked after first.

It may be stated that there is reasonable hope for success in destroying the chestnut blight and keeping it permanently out of the state, provided the owners are willing to do their just part, and provided the state legislature at its next session appropriates funds for carrying on to completion the work that is now made possible through funds supplied by the Federal government and through the limited funds available from the treasury of the state.

BULLETIN No. 3.**Vol. 1. No. 3.**

THE SAN JOSE SCALE.*

W. E. Rumsey.

Of all the insects that attack our orchards the San Jose scale is the most destructive and has caused more alarm than any other fruit tree pest. Since its appearance in the United States this insect has destroyed thousands upon thousands of fruit trees. Formerly it was not an uncommon sight to see large orchards dying from the scale, the deadened branches of the trees destitute of foliage and of an ashen gray color presenting a sickening aspect to the observer. Here and there in such an orchard one would see bunches of green leaves at the forks of the trees where new shoots had been put out in an effort to overcome the ravages of the pest (Fig. 1). At present, since satisfactory means of control have been devised, we seldom see large orchards dying from the effects of the San Jose scale, but the little home orchard and the few trees on town and city lots are still being killed by this pest each year because of the ignorance or neglect of the owners of such premises.

Native Home.

The San Jose scale is not a native of our country. This is one reason for its being so destructive to our orchards, for when a species of insect is introduced into a new country its parasitic and predaceous enemies are usually left behind and native beneficial insects are slow about attacking the newcomer. Furthermore the climatic conditions and environment in its new home may be just suited to its multiplication and spread. Therefore, with a favorable climate and devoid of natural enemies the imported species become so abundant that great destruction is the result.

In 1901-2 through explorations in Japan and China, and other eastern countries. Mr. C. L. Marlatt of the Bureau of Entomology, U. S. Department of Agriculture, found the native home of the scale to be in Northern China.

Early Occurrence in the United States.

About 1870 this insect became established in San Jose, California, on the property of James Lick, who for a number of years had been importing trees and shrubs from different parts of the world for beautifying his estate. In 1873, from this source of infection, the insect became a pest in the orchards in the neighborhood and soon

**Aspidiotus perniciosus*—Comstock.

spread from California to Oregon, Nevada, Washington and Idaho on the north, and to Arizona and New Mexico on the southeast.

In 1880 the insect was described and named by Prof. J. H. Comstock. Owing to the appearance of the insect in the city of San Jose it was given the common name of San Jose scale. However, this later proved to be a misnomer, for, as already stated the pest is now known to be a native of China. This name having been adopted and used for several



Fig. 1.—Peach tree nearly dead from work of the San Jose scale. After W. E. Britton, Conn. Agr. Expt. Sta.

years it is exceedingly doubtful if the insect will ever be designated as anything other than the San Jose scale among the farmers and fruit growers of the United States.

The first record of the occurrence of San Jose scale in the East was

in August, 1893, when Dr. C. H. Hedges of Charlottesville, Virginia, sent an infested pear to Dr. B. T. Galloway of the Division of Plant Pathology, Department of Agriculture, Washington, D. C., supposing it to be troubled with some plant disease. The specimen was submitted to Dr. L. O. Howard of the Division of Entomology, who at once recognized the presence of San Jose scale, and the fact was thus established that this destructive insect had reached the eastern part of the United States and could thrive in this climate as well as in the far West. Upon investigation it was soon learned that the pest already occurred in many of the eastern states. In 1896 specimens of the scale were received at the West Virginia Experiment Station from Wellsburg, Brooke County, and Georgetown, Monongalia County, West Virginia. These are the first records of its having been observed in this state.

Dissemination of the Insect.

Soon after the San Jose scale was found in the East the Division of Entomology at Washington started an investigation to learn, if possible, how and when it was introduced. This work established the fact that the scale was brought East on some plum nursery stock purchased in San Jose, California, by two New Jersey nurserymen about 1886 or 1887. These trees were transplanted on the grounds of the two firms and thus their premises became infested, and the stock sold therefrom started the eastern dissemination. Through the exchange of stock with other nurserymen many nurseries became infested and this insect has been scattered broadcast. While the transportation of nursery stock, scions and buds, are the principal means by which the San Jose scale is scattered from place to place, it is undoubtedly carried from orchard to orchard during the breeding season by certain large flying insects, by birds, and possibly by the wind. It may also be carried from tree to tree during the summer by those picking fruit or by the teams used in cultivation.

Life History and Habits.

Owing to the size and color of the San Jose scale (Fig. 3c) it is usually passed unnoticed by the fruit growers or casual observer until the infested tree is badly damaged.

The mature female scale is nearly circular in outline, about the size of an ordinary pin head and has a ring and nipple at the center (Fig. 2). The male scale is oblong-oval and about half the length of the diameter of the female scale. The nipple is located between the center and anterior end on the male scale. Owing to the color of the mature scales a tree badly infested has the appearance of having been coated with wood ashes.

The San Jose scale passes the winter in a half grown stage. A majority of the old insects and apparently all the very young are winter killed. The half grown hibernating individuals are black and about 95% are males. With the opening of spring they begin to feed and grow, the males reaching maturity in April when they crawl from

beneath their scaly coverings as perfect two-winged insects. About a month later the females begin to reproduce. The first males to be observed in an orchard by the writer were found during the first week in May and the earliest appearance of young was about the first week



Fig. 2.—San Jose scale. (Much enlarged.) After H. A. Gossard, Ohio Agr. Expt. Sta.

in June. Instead of laying eggs as is usual with scale insects the San Jose scale gives birth to living young which crawl about for a few hours apparently seeking suitable places to insert their beaks in the bark for



Fig. 3.—Three common scale insects, (natural size). a. Oyster Shell scale. b. Scurfy scale. c. San Jose scale.

the purpose of sipping nourishment therefrom. They are minute creatures of a yellow color scarcely visible to the naked eye. After the young have settled on bark, leaf or fruit, they begin to secrete from pores on their bodies a waxy substance which hardens in the atmosphere and with their cast skins forms the scaly covering. This scale-like covering is of a creamy-white color at first, but gradually darkens with age, assuming a black appearance when the insect is about half grown and finally, on reaching maturity the color fades to an ashen gray. At the first stage in the development of the insect, both male and female are alike, but during later growth there is a marked difference between them. With the first moult both sexes lose their legs and antennæ, or feelers, but when fully grown the males have again developed legs and antennæ. They also have two perfect wings and in place of mouth parts there is an extra pair of eyes. The mature female possesses nothing more than the sucking mouth-parts and reproductive organs. While the mature male crawls from beneath its scale a perfect winged insect, the female has no means of locomotion and never leaves her scale. For about six weeks she brings forth her young, the number varying in different individuals from 100 to 500. With this rapidity of multiplication one can easily understand the enormous number produced by this species during a season. As reproduction continues from late spring or early summer, until frost occurs in the fall, is it any wonder that trees are killed outright by this pest?

Kinds of Plants Infested.

A great many kinds of plants, shrubs, and trees are attacked by the San Jose scale. The list given below is taken from Bulletin No. 12 of the Bureau of Entomology, but since its publication many additional plants have been found to harbor this insect.

Orchard Fruits:

Apple, peach, apricot, pear, plum, cherry, Rocky Mountain dwarf cherry, persimmon, quince, and flowering quince.

Bush Fruits:

Raspberry, gooseberry, currant, flowering currant, black currant and grape.

Nut Fruits:

Almond, chestnut, pecan, black walnut, English walnut, Japan walnut.

Miscellaneous Ornamental Plants, Forest and Shade Trees:

Rose, hawthorn, spirea, fire thorn, Euonymus, English hawberry, linden, accacia, elm, osage orange, alder, sumac, weeping willow, English willow, golden willow, laurel leaved willow, milk

weed, catalpa, Lombardy poplar, Carolina poplar, golden leaved poplar, silver maple, cut-leaved birch, mountain ash, Japanese quince, Actinidia, Citrus trifoliata, red dogwood, snowball, Juneberry, loquat, laurel and Akebia.

With all these plants and many others supplying food for the San Jose scale it is impossible to exterminate it when once thoroughly established in a locality. However, by proper treatment it can be checked and its injuries reduced to a minimum.

Natural Enemies.

The San Jose scale has many insect enemies both parasitic and predaceous. Up to 1906 Marlatt records eight species of true parasites in Bulletin No. 62 of the Bureau of Entomology. None of these feed on it exclusively but attack other species of scale insects. One often finds San Jose scale with a tiny hole in the scale, this is evidence of the escape of one of these minute parasitic flies in its winged stage, the grub or larval stage having been passed within the body of the scale insect.

Among its pedaceous insect enemies the ladybirds hold first rank. A little black ladybird known scientifically as *Microweisea misella* is usually the most abundant species in scale infested orchards and destroys great numbers of the pest. In China the scale is attacked by a ladybird * very closely resembling our native twice-stabbed † ladybird, which is perhaps the greatest agency in keeping the pest in check in that country. This foreign ladybird has been imported into the United States and attempts made to colonize it at Washington, D. C. and in many of the states, but without avail, except for a time in Georgia. The colony at Washington where breeding was carried on for the purpose of sending colonies to the different states seemed to flourish until the scale infested trees were somewhat cleaned up by the ladybird, and it was attacked by one of our native parasitic insects which destroyed it in great numbers. One species of insect is preyed upon by another and it often happens that the one destroyed would be beneficial to man in attacking insects which destroy crops. This condition of affairs reminds us of the old adage:

"So naturalists observe, a flea
Has smaller fleas that on him prey;
And these have smaller still to bite 'em;
And so proceed *ad infinitum*."

Besides the insect enemies of the San Jose scale just mentioned there are some fungous diseases that attack this species and in certain sections of the United States have done much toward checking its multiplication for a time. Weather conditions must be suitable in order that these diseases may increase sufficiently to destroy many scale

**Chilocorus similis*.

†*Chilocorus bivulnerus*.

insects. Warm moist weather is conducive to the increase and spread of fungous diseases.

Although the San Jose scale has many natural enemies, yet up to the present it has been steadily on the increase in practically all sections where it has been introduced and the climatic conditions are favorable for its multiplication. Occasionally it is reported that an insect or disease has appeared that will annihilate the scale and thus no more time and money need be spent in spraying to control it. During the past season (1913) a report of this character started in Pennsylvania and the newspapers spread it broadcast. We would advise farmers and fruit growers to go slow in accepting such rumors and to stick closely to the spray pump—a sure destroyer of the San Jose scale. Not until this pest is found in every orchard and dooryard is there much hopes of its being held in check by natural enemies, imported or otherwise, for the pest must be abundant enough at all times to furnish sufficient food for the maintenance of these scale destroyers. When the scale is killed out in one place there must be more nearby or the beneficial insects will die of starvation.

Methods of Control.

Since the San Jose scale is a sucking insect, spray materials that kill by contact must be used to destroy it. However, no weak material will suffice since the insect is well protected by its scale. Therefore to accomplish the desired end, strong, penetrating or corrosive substances must be employed and in order not to injure the infested plants the application must be made during the dormant season. While it is possible to kill the newly born scale insects with materials that do not injure growing plants still this is not practical since the San Jose scale is being born continuously throughout the summer season. Therefore all spray materials described in this bulletin for this insect refer to those used on dormant trees.

In California where the scale commenced to damage the fruit trees in and about San Jose the people began devising ways and means to control it, and luckily hit upon a mixture of lime, sulphur and salt which was used in Australia as a sheep dip. This material proved effective and has been used since that time with but slight changes.

When it was found that the San Jose scale had established itself in the eastern United States, experiments for its control were at once instituted by the Division of Entomology at Washington and were soon taken up by the state Experiment Stations. Among the first materials to be tried was the California wash but at first this did not seem to be giving satisfactory results; therefore, many other substances were tested, among which might be mentioned kerosene (lamp oil), crude petroleum, whale oil soap, kerosene emulsion and miscible oils.

Kerosene and Crude Petroleum.

In testing these oils hundreds, yes thousands of fruit trees were either killed outright or severely injured. Peach trees suffered most

during this reign of uncertainty and experimentation. In an orchard of apple and peach trees where several grades of crude petroleum had been used the writer saw every peach tree killed and the apple trees so badly injured that it took several years for them to regain their former vigor. To spray with pure kerosene or crude petroleum without injuring the trees it is necessary to use it when weather conditions are just right and apply only enough to dampen the bark, still the trees must be completely covered with the material to properly check the San Jose scale. There are too many requirements to be kept in mind to make these non-emulsified oils of practical use as spray materials against the San Jose scale for the average fruit grower.

Whale-oil Soap.

Whale-oil soap is an exceedingly valuable insecticide for soft bodied sucking insects and will also destroy mature scale insects if used with sufficient strength. However, as a rule, it is too expensive for general use as an orchard spray and has been superseded by other substance for fighting the San Jose scale.

Kerosene and Crude-oil Emulsion.

Kerosene, or crude-oil emulsions have been used extensively and satisfactorily against the San Jose scale and are often employed because the materials are always easily secured. They are made as follows: Dissolve one-half pound of hard soap (sliced thin) or one pint of soft soap, in one gallon of hot water, and to this add two gallons of kerosene or crude-oil. Now agitate the mixture for eight or ten minutes by pumping it through a pump. This churning will convert the substance into a creamy mass and must be so thoroughly done that no free oil is present in the mixture. For use against the San Jose scale in the winter when the trees are dormant take one part of this stock emulsion to 3 or 4 parts of water. As a summer spray against plant lice and the like, use one part of the emulsion to 10 or 12 parts of water. Spray thoroughly.

Miscible Oil Sprays.

On account of the introduction and spread of the San Jose scale in the United States several companies have sprung up for the purpose of manufacturing concentrated spray materials for use against this insect. There are now on the market many brands of miscible oils or so-called soluble oils sprays known under various trade names. These materials are more desirable to handle but cost more than lime sulphur, and some brands do not seem to give as uniform results; however, owing to their spreading and penetrating qualities many orchardists still prefer to use these emulsified oils in the fall or winter on badly infested orchards, following up in the spring, just before the buds open, with an application of lime sulphur as another safeguard against the scale and also to check fungous diseases.

Miscible oil sprays can be readily made by the orchardist. For information concerning their preparation see Bulletin No. 85, Pennsylvania Agricultural Experiment Station, State College, Pa.; Bulletin No. 49, Storrs Agricultural Experiment Station; Storrs, Conn. and Bulletin No. 75, Delaware Agricultural Experiment Station, Newark, Delaware. These may be secured by writing to the stations where they are published.

Lime Sulphur Sprays.

Lime sulphur is now considered by the majority of fruit growers to be the cheapest and best spray to use against the San Jose scale. While the formulas for making the home product may vary somewhat as to the amount of ingredients used, as a rule any one of them will give good results. An excess of lime produces a whiter coating on the trees but is objectionable in that it is more difficult to spray and is a slight waste of material.

Home-made Lime Sulphur for Immediate Use.

Stone lime (unslaked).....	20 lbs.
Flowers (or flour) of sulphur.....	15 lbs.
Water to make.....	50 gal.

Slake the lime in a small quantity of hot water in the cooking vessel. Either sift the sulphur or, better still, make it into a paste by using a little water and add it to the slaking lime. Add more water and boil for 60 minutes, stirring occasionally. Dilute to 50 gallons and apply at once. Strain before placing in a spray pump or tank. If needed in large quantities cooking by steam is more convenient.

Home-made Concentrated Lime Sulphur

Stone lime (unslaked).....	40 lbs.
Flowers (or flour) of sulphur, or ground brimstone.....	80 lbs.
Water to make.....	50 gal.

With a few gallons of hot water in the cooking vessel add the lime gradually. Have the sulphur worked into a paste with a little water and pour it slowly into the slaking lime. Stir constantly to prevent the formation of lumps. When the slaking is finished add water to make 50 gallons and boil lightly for an hour. When through boiling add enough water to make up for evaporation. If steam is used for cooking no water need be added since the condensation of the steam will compensate for the evaporation. This product will keep if stored in filled and tightly corked containers.

Each batch of this mixture should be tested with a Beaumé hydrometer and its strength noted, which will vary from 24° to 27° Beaumé. Hydrometers can be had from Bausch and Lomb Optical Co., Rochester, N. Y., and from the Carbondale Glass Co., Carbondale, Pa.

A number of spray manufacturers include in their output a concentrated form of lime sulphur which is at present being used extensively

by fruit growers. The commercial product is more concentrated than the home-made material, usually testing at least 33° Beaumé.

Following is a table giving the dilutions for different readings of the hydrometer for both the San Jose scale dormant spray and summer spray for plant diseases.

Dilution Table for Lime Sulphur Solutions.

Reading on Beaumé Hydrometer.	Number of Gallons of Water to One Gal- lon of Lime Sulphur Solution.	
	For San José Scale. Dormant Spraying Only.	For Summer Spraying.
36 degrees	9	45
35 "	8 $\frac{3}{4}$	43 $\frac{1}{4}$
34 "	8 $\frac{1}{4}$	41 $\frac{1}{2}$
33 "	8	40
32 "	7 $\frac{1}{2}$	37 $\frac{3}{4}$
31 "	7 $\frac{1}{4}$	36 $\frac{1}{4}$
30 "	6 $\frac{3}{4}$	34 $\frac{1}{4}$
29 "	6 $\frac{1}{2}$	32 $\frac{3}{4}$
28 "	6	31
27 "	5 $\frac{3}{4}$	29 $\frac{1}{2}$
26 "	5 $\frac{1}{4}$	27 $\frac{3}{4}$
25 "	5	26
24 "	4 $\frac{1}{2}$	24 $\frac{1}{4}$
23 "	4 $\frac{1}{4}$	22 $\frac{3}{4}$
22 "	3 $\frac{3}{4}$	21 $\frac{1}{4}$
21 "	3 $\frac{1}{2}$	19 $\frac{3}{4}$
20 "	3 $\frac{1}{4}$	18 $\frac{1}{4}$
19 "	3	17
18 "	2 $\frac{3}{4}$	16
17 "	2 $\frac{1}{2}$	15
16 "	2 $\frac{1}{4}$	14
15 "	2	12 $\frac{3}{4}$

How to Spray.

Your spray material may be ideal but thoroughness of its application is the price of success no matter what kind of insect or plant disease you are trying to control. Do not forget this admonition in your fight against the San Jose scale. Remember the minuteness of an individual scale and that each one must be hit with the insecticide to kill it. Therefore the infested tree must be completely covered with the material, and this can be done only by spraying from all four sides. As already stated the San Jose scale sprays mentioned in this bulletin are for use on dormant trees, which means they can be applied at any time from late fall, after the wood has ripened and the foliage is down, until early spring just before the buds open.

In beginning the fight against this insect where the trees are badly infested it is a good plan to spray twice while the trees are dormant. One application being made in the fall and the other in the spring. However, after the pest is once under control one careful spraying each year will suffice. If infested trees are pruned before spraying is begun a considerable amount of material may be saved and the work may also be more readily done.

Conclusion.

To get concerted action against injurious insects and plant diseases in West Virginia the Crop Pest Commission is making an earnest effort to keep these troubles continually before the farmers and fruit growers of the state by means of conferences, publications and work of the local inspectors. By these activities it is hoped that all concerned may be led to more fully appreciate the seriousness of the situation and join hands in the fight for relief. It has already been demonstrated that by thorough spraying anyone may control the San Jose scale in his orchard. Other troubles such as apple rust and the like, which now confront the fruit grower or may appear in the future, we believe can and will be subdued through investigations of the Experiment Station and by the co-operation of the people at large.

One of the duties of the State Entomologist is to identify specimens of insects which are injuring the crops of farmers and fruit growers, and give instructions concerning the best known methods for preventing damage from these pests. Therefore, to accomplish the most good possible along this line, we request all who desire advice to send specimens of insects and their work with a description of the damage done by them, to the State Entomologist, Morgantown, W. Va. Pack in tin or wooden boxes and mail by parcel post. Do not forget to put the name and address of the sender on the package.

Spray Pumps and Insecticides.

For the convenience of the fruit grower a list of some spray pump and insecticide manufacturers is given below:

Manufacturers of Spray Machinery.

American Sprayer Co., Minneapolis, Minn. General.
Barnes Mfg. Co., Mansfield, Ohio. Hand outfits.
Bateman Mfg. Co., Grenloch, N. J. General.
Bean Spray Pump Co., Cleveland, Ohio. General.
Binks Spraying Machinery Co., Chicago, Ill. General.
Champion Mfg. Co., Pontiac, Mich. Power outfit.
Cushman Power Sprayer Co., Lincoln, Neb. Power outfit.
E. C. Brown Co., Rochester, N. Y. General.
Dayton Supply Co., Dayton, Ohio. General.
Deming Co., Salem, Ohio. General.
R. H. Deyo & Co., Binghamton, N. Y. Power outfit.
W. & B. Douglas, Middleton, Pa. Power outfit.
Fairbanks, Morse & Co., Cleveland, Ohio. Power outfit.
Field Force Pump Co., Elmira, N. Y. General.
Friend Mfg. Co., Gasport, N. Y. General.
Gilson Mfg. Co., Port Washington, Wis. Power outfit.
U. S. Grant Power Sprayer Co., Winchester, Va. Power outfit.
Goulds Mfg. Co., Seneca Falls, N. Y. General.
Griffith & Turner, Baltimore, Md. General.
The Hardie Mfg. Co., Hudson, Mich. General.
Hurst Mfg. Co., Canton, Ohio. General.
International Harvester Co. Local agencies. Power outfit.
Latham & Co., Canton, Ohio. General.
Morrill & Morley, Benton Harbor, Mich. Hand outfits.
F. E. Myers & Bro., Ashland, Ohio. General line of pumps.

The New Way Motor Co., Lansing, Mich. Power outfits.
Niagara Spraying Co., Middleport, N. Y. Carbonic Acid Gas.
Olds Gas Power Co., Lansing, Mich. Power outfits.
Pierce-Loop Co., Northeast, Pa. Compressed air.
Sparamotor Co., Buffalo, N. Y. General.
Wm. Stahl Sprayer Co., Quincy, Ill. Hand outfits.

Manufacturers of Spray Materials.

Grasselli Chemical Co., Cleveland, Ohio. General.
Thomsen Chemical Co., Baltimore, Md. General.
Sherwin-Williams Co., Cleveland, Ohio. General.
Toledo Rex Co., Toledo, Ohio. Lime sulphur solution.
B. G. Pratt Co., New York. General.
Bowker Insecticide Co., Boston, Mass. General.
Vreeland Chemical Co., New York, N. Y. Insecticides.
Battelle & Renwick, New York, N. Y. Sulphur.
Bergenport Sulphur Works, New York, N. Y. Sulphur.
James Good, 939-941 N. Front St., Phila., Pa. Whale-oil soap.

Bulletin No. 4 (Vol. 1, No. 4)

THE PERIODICAL CICADA IN WEST VIRGINIA IN 1914.

W. E. Rumsey.

The periodical cicada*, or so-called seventeen year locust, is a unique insect in point of longevity and subterranean existence. This insect is peculiar to America and appears in different broods in various parts of the country. It is now known that there are two distinct races of the cicada—one requiring seventeen years to complete its development while the other takes but thirteen years. In the main the former occupies the northern or northeastern part of the United States, while the latter occurs in the southern or southeastern portions of the country; however, the extent of their range is such that the two races overlap considerably.

Since West Virginia does not have any broods of the thirteen year race we will direct our attention to the other race and especially to Brood V (Marlatt) which will occur this year (1914) in the greater portion of the state. This brood will appear throughout the counties of Barbour, Braxton, Brooke, Calhoun, Clay, Doddridge, Gilmer, Harrison, Jackson, Lewis, Marion, Marshall, Monongalia, Ohio, Pleasants, Ritchie, Roane, Taylor, Tyler, Upshur, Wetzel, Wirt, and Wood. It will also occur in a large portion of Grant, Hardy, Kanawha, Mason, Nicholas, Preston, Putnam, Randolph, Tucker and Webster counties. Besides the places mentioned the insect will likewise be present in a small area in the northwestern part of Fayette County, in a narrow belt across the western part of Mineral County, in the southwestern half of Hancock County and the northwestern corner of Pocahontas County with a detached area in its center. This brood, which occurs in 37 of the 55 counties, is undoubtedly the largest in West Virginia. The shaded portion of the map (Fig. 3) represents the portion of the state occupied by this brood in its 1897 appearance.

Life History and Habits.

Those who have witnessed the occurrence of a brood of the cicada can never forget the incessant din produced by the f-a-r-r-o song of thousands of males and the characteristic attitude assumed by the voiceless females busily engaged in puncturing twigs in which to deposit their eggs.

From four to six weeks is the duration of the adult existence of the cicada. During the month of June the females deposit (it is estimated) from 400 to 600 eggs in punctures made for this purpose in twigs. Figure 1 illustrates these punctures. The duration of the egg stage varies, owing to different weather conditions, from six to seven weeks. The eggs are about one-twelfth of an inch long and are of a pearly white color and exceedingly delicate.

**Cicada septendecim*, Linn.

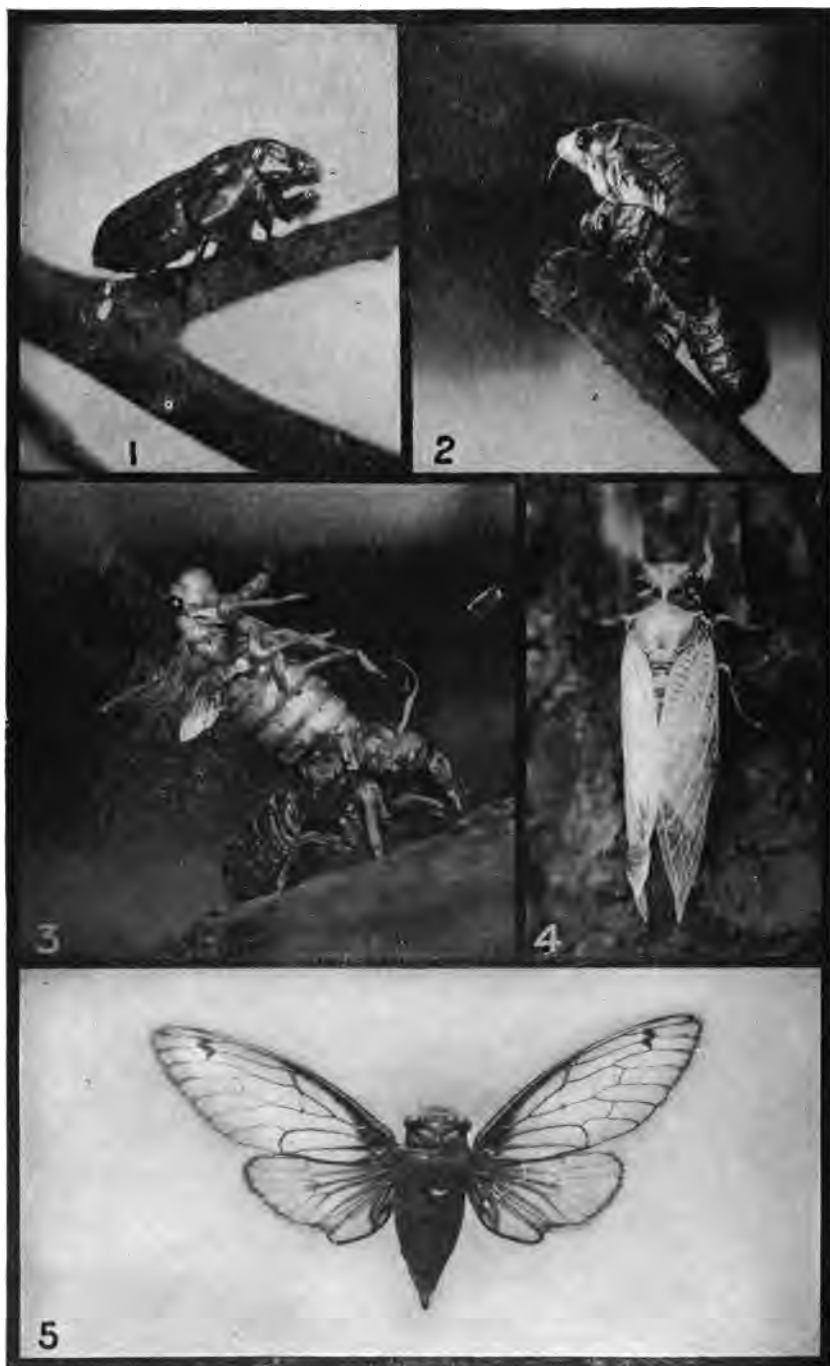


Plate 1.—Transformation of the Periodical Cicada from the last nymphal stage to adult. 1, Nymph ready for last moult. 2 and 3, Emergence of adult. 4, Newly emerged adult. 5, Adult with wings spread. (After Marlatt.)

The newly hatched cicada is not more than one-sixteenth of an inch long, of a yellowish-white color, except the claws of the front legs and the eyes which are reddish. This creature runs about with a quick motion as soon as hatched, goes to the side of the twig, deliberately tumbles off, and, owing to its lightness, settles gently to the ground. Here it immediately enters the soil through a crack in the surface or at the base of a plant where it remains at a depth varying from one to six feet, for nearly seventeen years, feeding upon the juices from roots of plants or upon nourishment obtained from the moist soil itself. It undergoes all its nymphal changes except the last one, in the earth. During the early spring of the seventeenth year the immature cicadas begin to make preparations to emerge from their subterranean quarters by burrowing or boring to the surface. Usually by the last of April these exits are completed and are kept open until the insects are ready to appear. Besides keeping the exits open, the cicadas sometimes build up from the surface little clay tubes two to four inches high.

About the middle of May the cicadas leave their dungeon-like homes to appear in the open air. This time varies somewhat, owing to the differences in latitude and elevation, over the area occupied by the brood. On emerging from the soil in the nymphal stage these insects crawl up some object such as weed, bush, post, tree or whatever is near. Here they station themselves, their skins split open in the back and the adult, winged cicadas work their way out. (Plate 1.) Having been exposed to the action of the atmosphere for a sufficient length of time the wings expand and harden after which the cicadas fly about to enjoy a short aerial existence.

Injury Caused by the Cicada.

When the cicada appears suddenly in countless hordes the damage it does to plants and trees is not as a rule seriously injurious except to young fruit trees, nursery stock, and young shade trees. The damage to such trees is due wholly to the characteristic habit of the females in depositing their eggs (Fig. 1). This has already been explained. Sometimes on young trees not only the twigs and branches will be riddled by punctures of the females, but the trunks themselves will be seriously injured in the same way. It is readily understood that work of this character on young trees is of an exceedingly injurious nature, but in forest growths where the trees are numerous the insects have an abundance of wood in which to deposit their eggs and no individual tree, ordinarily, receives enough punctures to be of any appreciable detriment to its growth or vitality. To a certain extent this holds good with old bearing fruit orchards except, perhaps, in the case of bearing apple trees in which the wounds made by the cicada furnish the conditions best suited for the attack of the woolly apple-aphis. These pests congregate in these injured places and by their work aggravate and prevent the healing of the wounds (Fig. 2). The limbs of the trees thus affected are much weakened and easily broken.

Natural Enemies of the Cicada.

Owing to the long subterranean existence and short aerial life of the cicada it does not seem to have any specific parasitic or predaceous



Fig. 1.—Work of the Periodical Cicada in maple and cherry. a, Fresh wound in maple; b, d and f, four months old wounds in maple. c, Three months old wounds in cherry, showing punctures extending both towards the tip and base of twig. e, Wounds healed in one season.

enemies. One can scarcely conceive of any parasite living solely on either the eggs or the adults, for it would seem impossible for them to tide themselves over the long period that elapses between the egg and the adult. Notwithstanding the peculiar life of the cicada there are several general parasites and predaceous insects that attack its eggs. Undoubtedly many predaceous ground beetle larvæ feed upon the immature cicadas near the surface of the ground. Among the

insect enemies of the adult, a digger wasp, (the cicada killer) might be mentioned. This wasp provisions its egg cells with cicadas as food for the developing young. Various animals, many birds, and all kinds of poultry are exceedingly fond of cicadas. Hogs will root over large areas of ground in the hunt for these insects. If there is one redeeming trait in the English sparrow it is its liking for the periodical cicada. This bird keeps up an incessant attack upon the cicada from



Fig. 2.—Periodical Cicada wounds seventeen years old; a, b, c, apple; d, e, f, pear. Attacks of other insects and fungous diseases have no doubt prevented proper healing of the injured places.

the time it appears until its short life is ended, and undoubtedly thereby lessens the number of individuals in swarms that occur in and about cities and towns.

When weather conditions are favorable fungous diseases attack and destroy many adult cicadas.

How to Prevent Cicada Injury.

Spraying to check damage from this insect is out of the question for large orchards, but may be feasible in treating a small number of trees. The best material for this purpose is kerosene emulsion and it is necessary to spray repeatedly to kill the insects as they appear. As already stated, it is young trees that suffer most from the stings of the cicada. If one has but a few small shade or fruit trees which he wishes to protect from this insect he can do it quite readily by covering the trees with mosquito bar or cheese cloth during the time the cicada is present.

It is not advisable to prune young orchards in the winter or spring before the appearance of a cicada brood. Leaving all the previous season's growth on the tree will allow a greater distribution of the work of the females and thus the probability of serious injury from the punctures will be minimized. The injured wood should be pruned out as soon as may be possible after the cicadas have gone. The mutilated portions of the tree that are not cut out in pruning should be



Fig. 3.—Shaded area of map shows distribution of Brood V (Marlatt) of the Cicada as it occurred in West Virginia in 1897.

protected with grafting wax or hard soap to prevent other insects or fungous diseases from attacking the tree at these stung places and thus aggravating the wounds and preventing rapid healing. To induce quick recovery from cicada wounds an orchard should have special care to stimulate vigorous growth after having been visited by this insect.

Nurserymen located within the area of this brood will undoubtedly

suffer severe loss from the ovipositing of the cicada in their nursery stock. It will be well for such parties to study the map (Fig. 3) and determine whether or not their stock is growing in the territory that will be visited by this insect, that they may be prepared to exercise any means possible to decrease the damage. Hand picking with a large force of men and boys will undoubtedly save many trees, but the cicadas must be gathered daily to accomplish the most good. Mornings and evenings are best suited for this work because the insects are more sluggish at such times. Although this procedure may save thousands of trees, no nurseryman need expect to escape without losing a portion of his stock. Spraying the immature cicadas with kerosene emulsion while they are going through their last transformation in leaving the ground, will prevent some injury that otherwise may be done to the growing nursery stock.

The most damage to young orchards and nursery stock will occur where the orchards and nurseries are on new land or near wooded tracts. This is due to the fact that during the presence of the previous swarms of this brood the timbered areas were used by the females for depositing eggs.

West Virginia is within the range of several broods of the seventeen year race of the periodical cicada and consequently, somewhere in the state, a swarm is present every few years. On this account it is well for fruit growers and prospective orchardists to post themselves concerning this matter so that they may avoid planting orchards during the fall previous to, or the spring of a year in which the cicada is due in their territory. Another brood is due next year (1915). It will be present in several parts of West Virginia but, probably, in greater abundance in the eastern and northern panhandles of the state than elsewhere.

THE GREEN APPLE-APHIS AND OTHER PLANT LICE.

L. M. Peairs.

Among the insects commonly known as plant lice which attack the foliage of the apple in West Virginia, the green apple-aphis* is predominant. Injury done by other species is generally negligible; their outbreaks are sporadic and usually not of long duration. The apple-aphis, on the other hand, is a regular annual source of loss to fruit growers, and as such must be considered in the plans for the prevention of insect injury.

The apple-aphis, or the green apple-aphis, as it is variously called to distinguish it from other species that may occur with it, is a small, oval or egg-shaped, green, louse-like insect, winged or wingless. The body proper, in fully grown specimens, is a trifle more than one-sixteenth of an inch in length. The aphids or plant-lice will, however, be much more readily recognized by the results of their presence on the foliage than by any description that can be given. They occur on the growing parts of the apple, usually on the under sides of the leaves along the ribs or veins. From here they spread all over the under surface of the leaves and onto the growing and tender leaf, flower stems, and twigs and may even feed upon the young fruit. They live in so-called colonies which are really nothing but large families. In these colonies or families several kinds of individuals may be found.

Life History.

In the fall, true sexual females and males are produced. These females produce the winter eggs. The eggs are black, oval, shining, and very small—not more than one-fiftieth of an inch long—and are deposited on the terminal buds and under or near bark scales or other irregularities that may afford some protection. They may be found farther back on the limbs but are more abundant near the tips. In spite of their small size they are readily found, especially when they are at all numerous and threaten to be troublesome. In the early spring, at the time when the first green shows on the trees these eggs hatch into wingless females which reproduce without males. These give birth to living young, some of which remain wingless, others becoming winged, all agamic; and a succession of generations of this kind follows. The presence of the winged forms enables them the more easily to spread from tree to tree. Unlike some of the other species found on apple trees in the spring, the true apple-aphis passes the entire season on the apple. Just what prompts them to give rise to the sexual generation in the fall is not known. It is probably the physiological condition of the plants together with the weather. However that may be, such a generation is produced and from it comes the supply of eggs that pass through the winter. This completes the life history.

Several factors enable the aphids to increase, under favorable conditions, with almost unbelievable rapidity. Among these are, the short

**Aphis mali*, Fab.

time required for the young, born alive, to reach maturity and reproduce in their turn; the fact that most of the generations are composed entirely of females capable of reproducing without fertilization; and the large number of young that one individual is capable of producing. On the other hand the aphid is subject to the attacks of some natural

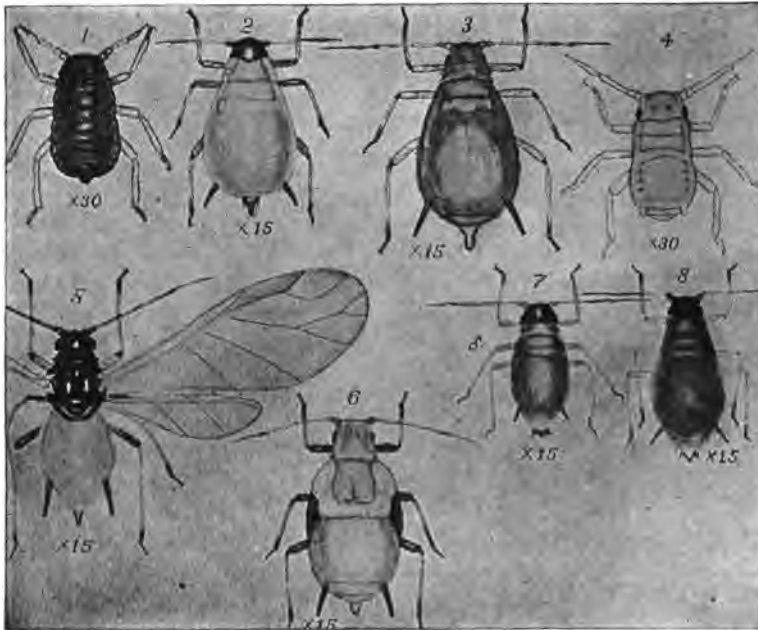


Fig. 4.—Different forms of the green apple-aphid. After Gillette and Taylor.

enemies that neutralize its powers of rapid reproduction, especially after the spring months. It will be noticed that the aphids are usually much more abundant in the spring and early summer than later. This is due to two causes, one of which is the fact that they can grow and reproduce at lower temperatures than can the parasitic forms, their natural enemies. It is, therefore, some time before the balance can be attained between the two, and before this is done the injury to trees and fruit is sometimes severe. The second reason for the greater abundance of the plant-lice in spring is that species other than the true apple-aphid are found on the apple in the early months but these later migrate to other plants where they spend the summer, returning to the apple near the end of the season. These species are the European grain-aphid* which is found on buds and blossoms rather than on leaves and is difficult to distinguish from the apple-aphid, and the rosy apple-

**Siphocoryne avenae*, Fab.

aphis†, which, as its name indicates, is of a rosy or reddish color. Its color varies greatly but the abdomen is proportionately larger and the insect itself is appreciably larger than either of the other species.

Nature of Injury Caused by Aphids.

Aphis injury is too well known to need much description. The most noticeable effect of the presence of the insects in large numbers is the curling of the leaves. This, in cases of severe infestation, may be followed by partial or complete defoliation of the trees but such severe injury is rare. Fruit is frequently misshapen from the work of the lice, and fruit stems may be weakened and result in an abnormal falling off of the young apples. Before the leaves have curled attention may be called to the aphids by the large numbers of ants seen on the

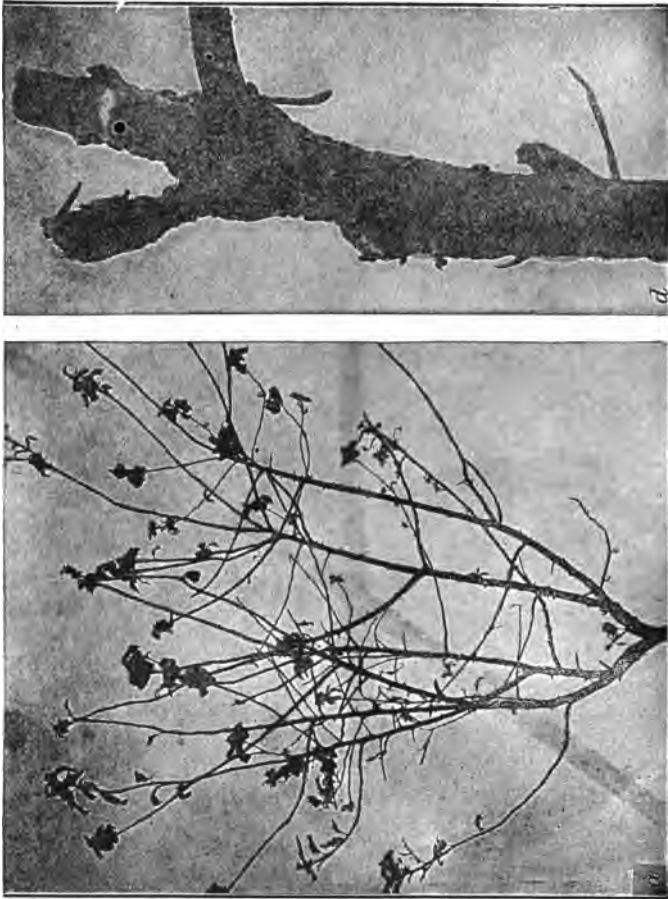


Fig. 5.—a, Partly defoliated young apple tree. b, Eggs of the apple-aphis on twig. After Sanderson.

†*Aphis malifoliae*, Fitch.

trees. These habitually attend plant-lice of all kinds and feed on a sweet substance called honey-dew, secreted by them.

Prevention and Treatment.

Prevention of attack by aphids is rather more simple than treatment. The method is to defer the San Jose scale or dormant spray until as near the end of the dormant season as safety will permit, and then to use the standard lime sulphur wash at the strength ordinarily employed for scale. This has been found to kill a large percentage of the winter eggs. Any young which may have hatched prematurely are all the more easily killed. It is necessary to be thorough in this work and to take special care to cover the tips of the twigs and branches.

When the dormant spray is neglected or proves to be ineffective, it often becomes necessary to spray after the foliage is out. If this treatment is to be of any value it must be applied before the leaves are badly curled, otherwise it will be almost impossible to reach the aphids, and as they do nothing but suck the juices of the tree, they are not to be killed except by contact.



Fig. 6.—A characteristic colony of apple-aphis on the under side of a leaf. After Sanderson.

The best materials for this treatment are tobacco decoction—either home-made or commercial, with convenience inclining one toward the commercial material and economy perhaps suggesting the former—and kerosene emulsion, which though less convenient is quite effective and has the advantage of being always immediately available.

No matter what material is used in this treatment it will be necessary to have good pressure and to have nozzles so arranged that the under sides of the leaves can be reached. It has been stated upon good authority that if tobacco extract be used it may be included in the regular sprays applied about the time the leaves unfold (the "cluster-cup" spray) thus avoiding the labor and expense of an extra spraying.

Formulae for mixing, and the proper strength for using, the various materials suggested, follow:



Fig. 7.—Young apples showing injury due to work of aphids.

Lime Sulphur Wash.

Commercial Beaumé test 33°, dilute one gallon of the wash with eight gallons of water; Beaumé test 30°, dilute one gallon to seven; test 28°, dilute one to six; test 25°, dilute one to five.

Lime Sulphur Wash, Home-Made Concentrated. Formula.

Lime	40 lbs.
Sulphur	80 lbs.
Water	50 gals.

Make the sulphur into a thin smooth paste, slake the lime with ten or fifteen gallons of water, adding the sulphur paste while the slaking is going on; then add water to make fifty gallons and boil for one hour. Add enough water to make full fifty gallons, put in a tight barrel and store, or dilute and use immediately. Dilutions should be made in accordance with the hydrometer test at the same rate as for the commercial material. (See Bulletin 3 of this series for more complete directions.)

The above materials are for dormant spraying only.

Tobacco Extract or Decoction.

Home-made tobacco extract is made by steeping tobacco stems or leaves in water for an hour or more, at the rate of $\frac{1}{2}$ lb. to 1 lb. of stems per gallon of water. More accurate dilutions cannot be given on account of the variation in the strength of waste tobacco products.

Of the commercial tobacco extracts, some of the Kentucky Tobacco Products Company's materials are best known. Good results have been secured from the use of their "Black Leaf 40" at the rate of one part to one thousand parts of water.

Kerosene Emulsion. Formula.

Kerosene or coal-oil	6 gals.
Hot water	3 gals.
Soft soap	1½ to 3 lbs.

Dissolve the soap in the hot water, pour in the kerosene and agitate violently until a creamy "emulsion" is formed. This agitation may be secured by pumping through the spray nozzle and back into the barrel with good pressure.

Dilute for use, to 100 gallons of spray. (At the rate of one gallon of emulsion to ten of water.)

The undiluted emulsion will keep several weeks without deterioration.

Arsenical sprays of whatever kind are useless for plant lice or aphids.



APPENDIX A

PROPOSED CROP PEST LAW

TO

Supersede the Present Statutes

APPENDIX A.

PROPOSED CROP PEST LAW TO SUPERSEDE THE PRESENT STATUTES.

A BILL to establish a State Crop Pest Commission and define its powers and duties; to prevent the introduction and spread and to provide for the control of the San Jose scale and other dangerous insects and dangerously injurious plant diseases affecting nursery, orchard, forest and shade trees, shrubs, vines, cuttings, seeds and bulbs, or affecting plants or parts of plants of any kind or such as may harbor such injurious insect pests or plant diseases; to provide for the sale of trees, vines and shrubbery and to require agents to be licensed, and to pay a fee therefor; to prevent false labeling and misrepresentation; to provide penalties for the violation of its provisions; to repeal chapter forty-eight of the acts of the legislature of one thousand nine hundred and three, chapter sixty-one of the acts of the legislature of one thousand nine hundred and five, chapter seventy-two of the acts of the legislature of one thousand nine hundred and seven, and chapter fourteen of the acts of the legislature of one thousand nine hundred and thirteen.

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| 1. State Crop Pest Commission created; powers and duties; appoint state entomologist; penalty for refusal to comply with orders; defining certain words in act. | 6. Penalty for sale of or giving away nursery stock without certificate; duty of transportation companies and penalty. |
| 2. Plants diseased to be designated; power of entomologist as to treatment or destruction; notice to owner and manner of service; appeal from decision of entomologist if no disease exists; appeal when property is of value; compensation and its payment; damages to persons on account of diseased premises; payment of treatment or destruction; lien on real estate; duty of sheriff and county clerk as to collection; superiority of lien. | 7. Certificate of registration required from auditor and fee therefor; expiration thereof; exhibiting copy; penalty for violation. |
| 3. Authority of officers to enter and inspect premises. | 8. Nurserymen to file names of agents. |
| 4. Power of state entomologist to appoint assistants and local inspectors; their compensation, how paid. | 9. Salesmen must comply with act; shall secure certificate; penalty for violation. |
| 5. State entomologist, or assistants shall inspect all nursery stock grown in this state and issue certificate. | 10. False labeling and penalty therefor. |
| | 11. False representation of agent and penalty therefor. |
| | 12. Wilful misrepresentation a misdemeanor; penalty therefor. |
| | 13. Prosecuting attorneys shall prosecute violations. Justices shall have concurrent jurisdiction with circuit courts. |
| | 14. State auditor's duty as to money coming into his hands for commission. |
| | 15. Vouchers for payments; payment thereof; chairman of commission; report to governor and the printing thereof. |
| | 16. Inconsistent laws repealed. |

Be it enacted by the Legislature of West Virginia:

Creation of Crop Pest Commission. Appointment of State Entomologist and Defining Certain Words in Act.

Section 1. That the Commissioner of Agriculture, the Director of the West Virginia Agricultural Experiment Station and the

3 President of the West Virginia Horticultural Society are hereby
4 created, ex-officio, a state crop pest commission, hereinafter called
5 "commission" with powers and duties as hereinafter provided. Said
6 commission shall appoint an entomologist of the West Virginia Agri-
7 cultural Experiment Station as state entomologist and plant patholo-
8 gist, hereinafter called "state entomologist," and shall fix his com-
9 pensation, and the state entomologist and his assistants and inspec-
10 tors shall, acting under the authority of said commission, be charged
11 with and perform such duties as are hereinafter specified. This
12 state crop pest commission shall, from time to time, after due con-
13 sideration, prepare a list of such dangerously injurious insect pests
14 and diseases of plants affecting nursery, orchard, forest and shade
15 trees, shrubs, vines, cuttings, seeds and bulbs, or affecting plants
16 or parts of plants of any kind, or such plants or products of plants
17 as may harbor such injurious insects or plant diseases as may prop-
18 erly, within its judgment, be controlled or eradicated, and they
19 shall cause such list to be published, along with particular specifi-
20 cations as to the nature and appearance of, and the manner in
21 which said pests are generally disseminated. The state crop pest
22 commission shall, from time to time, provide rules and regulations
23 under which the state entomologist shall proceed to investigate,
24 control, eradicate and prevent the dissemination of the said insect
25 pests and plant diseases and to treat or destroy such plants or parts
26 of plants or products of plants as may harbor such injurious insects
27 or plant diseases, as far as may be possible, and these rules and
28 regulations shall have the full force and effect of law so far as
29 they conform to this act and the general laws of this state and
30 of the United States; and any person who fails or refuses to
31 comply with the orders of directions issued in writing under
32 regulations provided by the state crop pest commission, shall
33 be guilty of a misdemeanor, and upon conviction thereof, be fined
34 the sum of not less than ten nor more than twenty-five dollars,
35 and may at the discretion of the court be imprisoned in the county
36 jail of the county wherein the crime was committed for a period
37 of not more than sixty days.

38 The word "plant" or "plants" shall include nursery stock,
39 orchard, forest and shade trees, vines, cuttings, seeds and bulbs,
40 plants or parts of plants of any kind, or the products of the fore-
41 going.

42 The word "person" in this act shall include any person, persons,
43 firm or corporation.

**Power of State Entomologist, Appeal from His Decision, Lien on
Real State, and Duties of Sheriff and County Court.**

Sec. 2. That should the state entomologist, his assistants or
2 local inspectors, find any plants infested or diseased with or
3 harboring insects, or diseases published by the state crop pest
4 commission as dangerously injurious, the aforesaid officers shall
5 mark or tag or otherwise specifically designate all such plants

6 infested with or harboring the aforesaid insects or diseases. The
7 state entomologist shall have power, under the rules and regula-
8 tions of said commission, to determine the nature and method of
9 treatment, including destruction, to which any such infested or
10 diseased plants, harboring dangerously injurious insects or plant
11 diseases shall be subjected, and he shall give notice of his
12 findings in print or writing to the owner of the infested premises
13 or plants, his agents or tenants or persons in charge of the
14 infested premises, and a copy of such notice shall be submitted to
15 the commission, and there shall accompany each and every such
16 notice specific directions as to the treatment or destruction of
17 the infested plants harboring such dangerously injurious insects
18 or plant diseases, which direction may be in printing or writing,
19 together with a copy of this act and all rules and regulations of
20 the commission. Service of such a notice may be made in the
21 manner prescribed by chapter 121 of the Code for the service of
22 notices, except that should the person upon whom it is desired
23 that notice should be served be a non-resident or a foreign cor-
24 poration, then the notice may be served by delivering a copy
25 thereof to the tenant or other person in charge of the premises,
26 or if the tenant or other person in charge be not found then
27 upon any member of their family, or by posting the notice at
28 the usual place of abode the same as though the tenant or other
29 person in charge should be the owner; or if there be no tenant
30 or other person in charge, notice posted at two conspicuous
31 places on the affected premises shall be regarded as sufficient
32 service five days next after the posting of such notice.

33 In case of objection to the order of the state entomologist
34 for the reason that no disease or infestation exists, an appeal
35 shall lie from said order to the commission, which appeal, how-
36 ever, must be made within three days next after the service of
37 notice. The owner shall notify the commission of his appeal by
38 registered mail, addressed to the place or point indicated in the
39 rules and regulations of the commission, and the appeal shall pro-
40 ceed under the rules and regulations of the commission and shall
41 act as a stay of proceedings until it is heard and decided. In
42 hearing all appeals, which shall be heard at such point as the
43 commission shall decide, the commission shall have power to
44 summon witnesses, administer oaths and hear testimony.

45 If any owner finds objection to the order of the state entomolo-
46 gist for the reason that said order will destroy property which is
47 of value to said owner, then the owner may appeal from said
48 order within three days from receipt of such notice to the com-
49 mission, claiming indemnity and compensation for said property.
50 The filing of said notice, however, shall not act as a stay of said
51 proceedings but the state entomologist or his assistants shall
52 proceed to appraise the damage to said property, and if the said
53 state entomologist or his assistants, or the owner agree upon the
54 damage for which indemnity is claimed, then each of them shall

55 sign a statement to that effect, which shall be forwarded to the
56 commission. If the amount of the damage cannot be agreed
57 upon by the state entomologist and the owner, then, on the same
58 day, the owner shall notify the state entomologist, or his assistants,
59 in writing, of his disagreement. The amount of the damage shall
60 then be determined by arbitrators, one to be appointed by the
61 entomologist, or his assistants, and one by the owner and these
62 two arbitrators shall select a third arbitrator. The decision of
63 any two of whom shall be final. Their decision shall be for-
64 warded to the commission. Arbitrators shall be paid not to
65 exceed \$3.00 per diem, which amount shall be paid by the com-
66 mission from its funds if the decision made is more than that
67 offered to be paid by the state entomologist, or his assistants, but
68 if the compensation is no more than that offered by the state
69 entomologist, or his assistants, then the owners shall pay the
70 cost of the arbitration. Arbitrators must be residents of the
71 state, but no other qualification shall be necessary. The appeal
72 shall proceed according to the rules and regulations of the com-
73 mission and no appeal taken under this paragraph shall prevent
74 the state entomologist, or his assistants or inspectors from notify-
75 ing the owners to treat or destroy, or from treating or destroying
76 property by reason of such appeal. They shall proceed the same
77 as if no indemnity were claimed. If the commission finds that
78 the appeal is not a proper one it shall dismiss the appeal and
79 the owner shall pay the costs.

80 If the commission should sustain the appeal, it shall order
81 the amount so ascertained to be paid to the owner by the county
82 court of the county in which the damage is sustained, and the
83 county court shall pay such damages out of the general fund of
84 the county treasury. The county fund shall be reimbursed for
85 one-half of the damage paid for it and the county court shall
86 draw its warrant against the commission for one-half of the
87 damage paid by said county court, which shall, when approved by
88 the chairman of said commission, be paid as other bills against
89 said commission are paid. Provided, however, that when in its
90 judgment the interests of the state warrant such action, the com-
91 mission may reimburse the county for more than one-half of the
92 damage paid.

93 No action of any character taken shall abate the damages, if
94 any, suffered by any person by reason of the owner's premises
95 harboring injurious insects or plant diseases.

96 If, upon the receipt of the notice aforesaid, or if an appeal
97 be taken because such infestation or disease does not exist and
98 the appeal dismissed, such person or persons so notified shall not
99 within ten days after notification, or the dismissal of the appeal,
100 as hereinbefore set out, destroy or treat the same in accordance
101 with said notice, then the state entomologist, his assistants or
102 employes shall destroy or treat all such plants. The necessary
103 expense shall be paid by the owner or owners of the real estate

104 from which said infestation has been removed in pursuance of
105 this act. The state entomologist shall ascertain the amount of
106 such charge, cause to be served upon said owner or any one in
107 possession and in charge of such real estate, a notice stating
108 the amount of said charge, or if no person be found in charge
109 by posting the notice as set out in this section, by items, and
110 further stating that if said charge be not paid to the sheriff of the
111 county wherein said real estate is located within twenty days
112 from the date of the service of said notice, that the same shall
113 become a lien upon the real estate. Copy of said notice, includ-
114 ing the amount of said charge together with the proof of service
115 shall be at once filed with the sheriff, and if said amount is not
116 paid to the sheriff within the time therein stated, said amount
117 shall become a lien on said real estate and shall be collected as
118 delinquent taxes are collected, the sheriff adding thereto a com-
119 mission of ten per cent of the entire amount as compensation to
120 him for collection, and said real estate shall be sold for the non-
121 payment of said charges the same as now, or may hereafter be
122 provided by law for sale of real estate for delinquent taxes, and
123 at the same time, or the sheriff may bring a suit in chancery for
124 its collection in the name of the State Crop Pest Commission. If
125 the sheriff is unable to collect the same within thirty days, next
126 after the twenty days shall have expired, the county court shall
127 draw an order and pay such charges out of the general fund of
128 the county. When said amount is collected by the sheriff it shall
129 be paid back into the general fund of said county. The sheriff
130 shall forward to the state treasurer on the first of each month all
131 amounts due the State Crop Pest Commission. These amounts
132 shall be paid into the general fund of the State Crop Pest Com-
133 mission.

134 When the copy of the notice is sent to the sheriff, the state
135 entomologist shall forward a copy also to the county clerk of
136 of said county, and the same shall be entered upon the proper
137 judgment lien docket, and, when so received and indexed by the
138 clerk, shall be notice to all subsequent purchasers and creditors.
139 This lien created by this section shall be superior to all other
140 liens upon the property, except taxes, and, in incorporated cities,
141 towns and villages, the lien shall be superior to all other liens,
142 except taxes and assessments for sewerage, paving and other
143 public improvements. The lien, when paid, shall be released by
144 the sheriff.

Authority of Officers to Enter Upon and Inspect Premises.

Sec. 3. The commission, its agents or employes, the state
2 entomologist, assistants, local inspectors, and all persons in their
3 employ, are hereby empowered with authority to enter upon any
4 public or private premises for the purpose of inspecting, destroying
5 or treating insects or plant diseases determined and published by
6 the commission to be dangerously injurious, or such plants as may

7 harbor such injurious insect pests or plant diseases as prescribed
8 in section one of this act. Any person who shall obstruct or hinder
9 the commission, its agents or employees, the state entomologist,
10 assistants, local inspectors, and all persons in their employ, in the
11 discharge of their duties, shall be guilty of a misdemeanor, and,
12 upon conviction thereof, shall be fined not less than twenty nor
13 more than fifty dollars for each such offense. A mandatory
14 injunction brought in the name of the commission will also lie
15 against the owner to compel submission to such inspection.

**Appointment of Assistants and Local Inspectors, Compensation of
Same, and How Paid.**

Sec. 4. The state entomologist shall have power to appoint,
2 by and with the consent of the commission, assistants and local
3 inspectors.. An assistant, under this act, shall have the same
4 power as the state entomologist; except he shall be under the
5 direction of and responsible to the state entomologist.

7 A local inspector, under this act, shall have the power to
8 inspect, but shall report to the state entomologist or to whom-
9 soever he shall direct. But a local inspector shall only have such
10 jurisdiction as to territory as may be given him by the state ento-
11 mologist.

12 An assistant shall be paid by the commission. A local inspector
13 shall be paid by the county court, and his compensation shall be
14 fixed by the commission, and shall not be less than three dollars a
15 day while actually employed. The county court shall also pay his
16 expenses.

17 Local inspectors shall file before the said county court from
18 time to time an itemized account of the expenses and costs incurred
19 in the performance of his or their duties, and a statement of the
20 days actually occupied in the performance of, the duties herein-
21 before prescribed, and the same shall be allowed him and paid as
22 other claims against the county except that the county court shall
23 not be compelled to pay on account of local inspectors, more than
24 two hundred and fifty dollars in any one year; but the county
25 court of any county may pay any sum in excess of two hundred and
26 fifty dollars that it may deem proper.

Inspection of West Virginia Nurseries.

Sec. 5. Prior to October fifteenth of each year the state ento-
2 mologist, or his assistants, shall inspect all nursery stock grown in
3 the state, and the state entomologist shall issue a certificate stating
4 the condition of the said nursery in such form as may be pre-
5 scribed by the commission.

**Certification of Nursery Stock from Within and Without the State,
and Duties of Transportation Companies.**

Sec. 6. It shall be unlawful to deliver or give away within the
2 boundaries of this state plants, commonly known as nursery stock,
3 which have not been duly inspected in accordance with the pro-

4 visions of this act and do not carry plainly attached to each car
5 load, box, bale, or package a copy of a certificate as herein provided,
6 except that in case of nursery stock shipped into the state from
7 without, the commission shall provide by regulation for the accep-
8 tance of proper certificates from other states, and when so accepted,
9 the state entomologist shall issue an official tag designating the fact,
10 which tag must be attached to all such shipments, but no nursery
11 stock shall be sold or shipped under the certificate issued as pro-
12 vided herein that was not raised in the nursery for or to which the
13 said certificate was issued, until such stock has been duly examined,
14 as provided herein, and found to be apparently free from any
15 dangerously injurious insect pest or plant disease. All transporta-
16 tion companies and common carriers bringing nursery stock into
17 this state shall immediately, upon receiving such consignment,
18 notify the state entomologist of the fact that such consignment is in
19 their possession, or is en route to some point within the state, and
20 give the names of the consignor and consignee, the point of ship-
21 ment and the destination of such consignment and whether it bears
22 the official tag hereinbefore required.

23 It shall be unlawful, after the promulgation of the rules and
24 regulations provided for in this act, for any person to transport by
25 land or water, plants, commonly known as nursery stock, in viola-
26 tion of the same, and every such offense shall constitute a misde-
27 meanor, and upon conviction thereof, the person or common carrier
28 so convicted shall be fined in the sum of not less than fifty dollars
29 nor more than one hundred dollars for each and every violation of
30 this act.

**Nurserymen's Registration Certificate. Exhibiting Copy of Same
by Agents.**

Sec. 7. It shall be unlawful for any person, either for him-
2 self or as agent for another, to offer for sale, sell, deliver or give
3 away within the bounds of this state, any plants, known as
4 nursery stock, unless such person shall have first procured from the
5 state auditor a certificate of registration, which certificate shall
6 contain such rules and regulations concerning the sale of nursery
7 stock as the commission may prescribe, and be approved and
8 countersigned by the state entomologist, who shall have full power,
9 and is hereby authorized and required to cancel and withdraw any
10 certificate upon satisfactory evidence that any rules and regula-
11 tions governing the sale of nursery stock within this state have
12 been violated by the holder of the same. The state auditor shall
13 not issue any certificate of registration, except upon the payment of
14 the sum of five dollars, and shall forward all certificates to the
15 state entomologist for his approval, before allowing the same to
16 the party making application therefor, and all such certificates as
17 may be granted shall expire and become null and void June
18 thirtieth next succeeding the issue thereof, and any person either
19 for himself or as an agent for another who shall sell, offer for sale,

20 deliver or give away any plants, commonly known as nursery stock,
21 without exhibiting a copy of the certificate of registration as herein
22 provided for to each and every person to whom he shall sell, offer
23 for sale, deliver or give away any such plants shall be deemed guilty
24 of a misdemeanor, and, upon conviction thereof, shall be punished
25 by a fine of not less than twenty dollars nor more than fifty dollars
26 for each offense.

Nurserymen File Names of Their Agents.

Sec. 8. Any person growing or dealing in nursery stock, before
2 receiving the above certificate of registration, shall file with the
3 state entomologist the names of all traveling salesmen or agents
4 representing such person in this state, and shall subsequently file
5 with the state entomologist the names of any other traveling sales-
6 men or agents, when so employed.

Salesmen to Comply With Act. Penalty for Violation.

Sec. 9. No person shall act as agent or traveling salesman in
2 this state for any person engaged in growing, selling or dealing in
3 plants, commonly known as nursery stock, until such person shall
4 have complied with all the provisions of the foregoing sections and
5 taken out the certificate of registration therein required; and
6 every such person acting as agent or salesman for any person
7 engaged in growing or selling plants, commonly known as nursery
8 stock, shall take from his employer a certificate showing that he is
9 the authorized agent or salesman of such person, and shall exhibit
10 the same to any person who demands to see such certificate, and
11 any person, who acting as such agent or salesman, fails to comply
12 with the provisions of this section shall be guilty of a misdemeanor,
13 and, upon conviction thereof, shall be fined the sum of not less than
14 ten dollars nor more than twenty-five dollars for each offense.

False Labeling and Penalty Therefor.

Sec. 10. Any person that shall label any plants commonly
2 known as nursery stock, by any false fictitious name or variety, or
3 who shall substitute without the permission of the purchaser,
4 plants from any nursery other than the one wherein it was repre-
5 sented the stock sold was grown, shall be guilty of a misdemeanor,
6 and, upon conviction thereof, shall be fined not less than twenty-five
7 nor more than one hundred dollars, and in addition thereto shall
8 forfeit the certificate of registration held.

False Representation of Agent and Penalty Therefor.

Sec. 11. Any person acting as agent or salesman for any
2 person who shall sell any plants, commonly known as nursery stock,
3 upon a certificate of agency, and who shall afterwards, without the
4 consent of the purchaser, procure them of and supply them from

5 the nursery of some person or place other than that which such
6 agent or salesman professed to represent, shall be fined not less
7 than twenty-five dollars nor more than one hundred dollars for
8 each offense.

Misrepresentation of Grade, Variety, Etc.

Sec. 12. Wilful misrepresentation of grade, character, variety
2 or quality of stock in a nursery or offered for sale by any nursery
3 dealer or agent, or a false declaration of acreage, or any conceal-
4 ment of stock from inspection, shall constitute a misdemeanor, and
5 upon conviction, the person so convicted shall be fined not less than
6 twenty-five dollars nor more than one hundred dollars for each
7 offense. All persons selling nursery stock in the state shall, if
8 required, furnish the state entomologist copies of all their litera-
9 ture, which is printed or otherwise duplicated, including cata-
10 logues, price lists, order forms, contracts and agreements, which are
11 furnished for the use of agents or customers or both.

Duties of Prosecuting Attorneys and Justices of the Peace.

Sec. 13. It shall be the duty of each prosecuting attorney to
2 whom the State Crop Pest Commission shall present evidence
3 of violation of any provision of this act, to institute and prosecute
4 without delay appropriate proceedings for its enforcement. Jus-
5 tices of the peace shall have concurrent jurisdiction with the cir-
6 cuit court to enforce the misdemeanor penalties herein prescribed.

State Auditor's Duties Concerning Commission Funds.

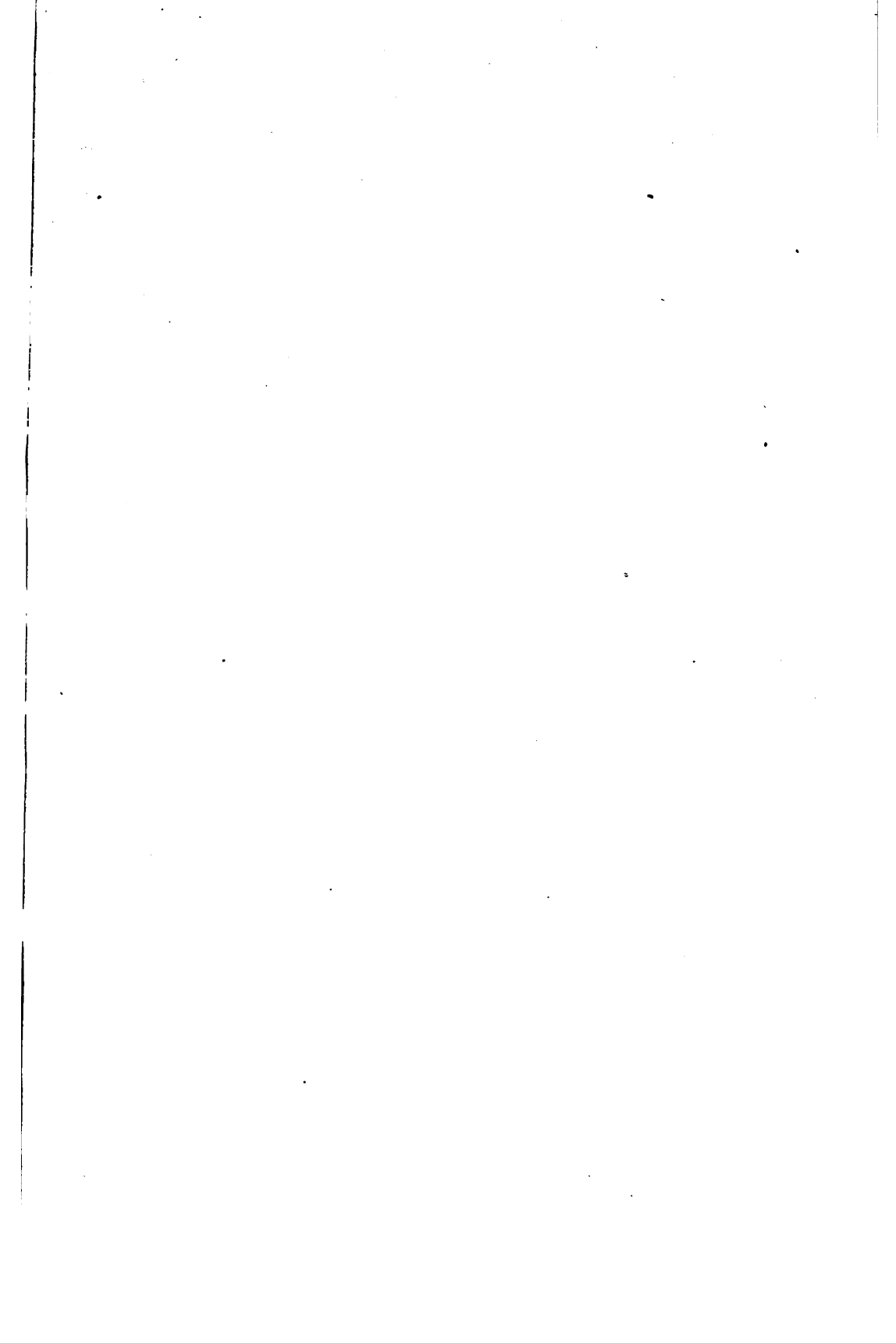
Sec. 14. The state auditor shall set aside and reserve all
2 moneys coming into his hands in pursuance of the provisions of this
3 act, and shall from time to time pay the same into the state treas-
4 ury to be placed to the credit of the commission as a fund of the
5 same to be used in payment of services and expenses incurred
6 under this act.

Payment of Charges Against the Crop Pest Commission.

Sec. 15. All charges against any appropriations for or funds
2 of the commission shall be upon properly itemized vouchers, as
3 may be prescribed by the state auditor, and shall be certified by the
4 state entomologist and the commissioner of agriculture, the latter
5 of whom shall be chairman of the commission. The commission
6 shall cause to be made a biennial report to the governor of the
7 state giving in detail its operations and expenditures under this
8 act, on or before September 1st of the year, prior to the regular ses-
9 sion of the legislature, and it shall be the duty of the state printer
10 to print the same in such numbers as the governor may direct.
11 The cost of such printing shall be paid out of the general printing
12 fund of the state.

Repeal of Inconsistent Laws.

Sec. 16. Chapter fourteen of the acts of one thousand nine hundred and thirteen, chapter seventy-two of the acts of one thousand nine hundred and seven, chapter sixty-one of the acts of one thousand nine hundred and five, and chapter forty-eight of the acts of one thousand nine hundred and three, and all other acts or parts of acts inconsistent with this act are hereby repealed.



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